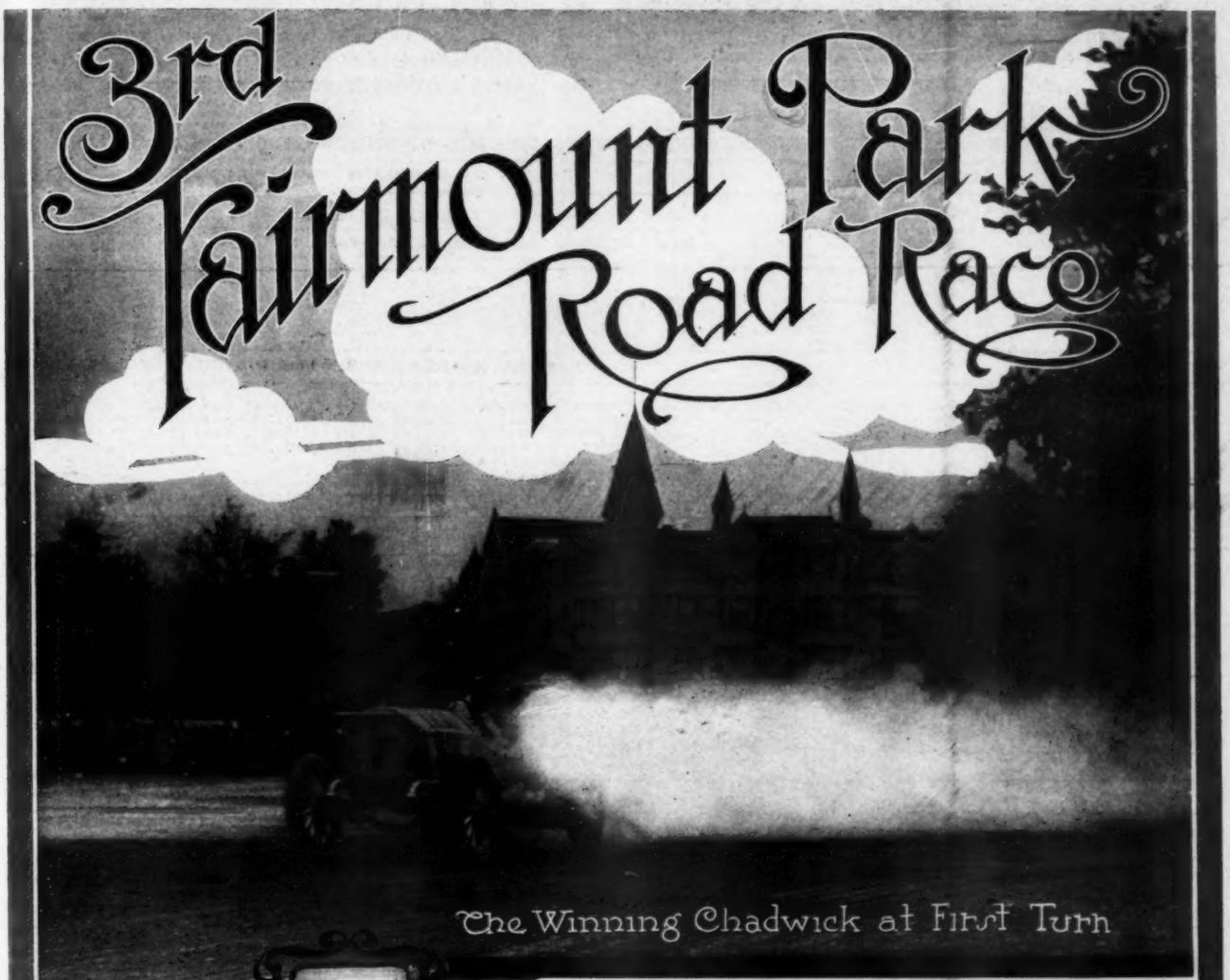
Vol. XXIII New York—Thursday, October 13, 1910—Chicago No. 15

THE AUTOMOBILE

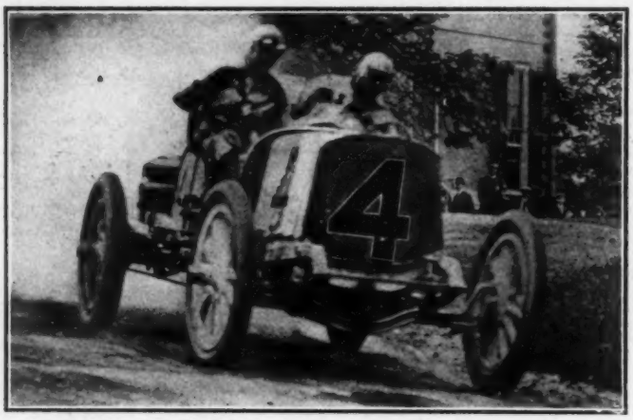
3rd Fairmount Park Road Race



The Winning Chadwick at First Turn

FINISHING in a neck-and-neck drive, the intensity of which has seldom been equaled in a sporting event of any kind, and never in an automobile road race, the Chadwick entry, No. 12, driven by Len Zengle, won the third renewal of the Fairmount Park Road Race at Philadelphia, Saturday, from the speedy and consistent Lozier, with Ralph Mulford at the wheel. For ten laps of the course, the winner lay close to the Lozier, sometimes one flashing by the grandstand in front and sometimes the other.

The finish was hair-raising. In the next to the last lap, the Lozier had established a lead of 9 seconds and shot past on the final round with the same steadiness that had characterized its running all through the race. There was a difference in the starting time of 80 seconds in favor of the Lozier and this, with the 9 seconds it led in actual time, put it 89 seconds ahead of the Chadwick at the start of the last lap. When the Chadwick came whistling down to the stand, the signal from the pits informed Zengle to "beat it" and the big car reared like a living thing as it set sail for the white flyer. Less than a minute after it had disappeared from view around the first turn a telephonic message conveyed the news that the Chadwick was suffering from tire trouble. It was learned that the car had thrown two shoes passing the turn. By a marvelously quick change the tires were replaced and the car was once more on its way.



Lozier, No. 4, rounding Sweet Briar Hill turn

It seemed ages before the white hood of the Lozier appeared at the head of the stretch, tire trouble having been experienced, but when it did it came with a rush that seemed able to carry it to victory. In fact, after the report of the tire trouble suffered by the rival car, the appearance of the Lozier, even after a slow round, 9:53:70, seemed to warrant its reception as the winner.

Soon into the straightaway swung the long red-hooded car. The pilot knew it was a matter of seconds and he drove as never before. So fast came the giant that the eager crowds drew away involuntarily as the car shot past. Only a few realized that there was a winning chance, but everybody understood that Zengle was making a most terrific and spectacular effort. The magpie banner waved as he sped on and the electric device showed that he had beaten the total elapsed time of the Lozier by about 6 seconds.

It was a Philadelphia victory gamely won, for the car is made not far from the Quaker city and the driver is a native son. The winner is entitled to every credit, but the showing of the

OFFICIAL TABLE SHOWING THE STANDING OF EACH OF THE 32 CARS THAT STARTED IN THE THIRD

DIVISION 6C—FOR CARS WITH PISTON DISPLACEMENT RANGING

No.	Car	Piston Displacement	Driver	1st Lap 8 Miles	2nd Lap 16 Miles	3rd Lap 24 Miles	4th Lap 32 Miles	5th Lap 40 Miles	6th Lap 48 Miles	7th Lap 56 Miles	8th Lap 64 Miles	9th Lap 72 Miles	10th Lap 80 Miles
12	Chadwick	707	Len Zengle	8:43	17:07	25:45	34:07	42:20	50:46	58:59	67:15	77:	85:17
5	Benz	731	E. R. Bergdoll	8:50	17:07	25:23	33:39	41:39	**49:41**	**57:48**	**66:03**	**74:12**	**82:25**
25	Chadwick	707	Al Mitchell	**8:10**	18:48	**25:07**	**33:18**	**41:30**	Struck Bank				
13	Simplex	672	W. C. Mullen	9:49	19:26	28:11	Cylinder						
22	Simplex	672	R. E. Beardsley	8:45	17:33	Struck Wall							
19	Simplex	672	I. Fred Betz	Crank Shaft									

DIVISION 5C—FOR CARS WITH PISTON DISPLACEMENT RANGING

4	Lozier	544	Ralph Mulford	8:32	**16:53**	25:17	33:40	41:58	50:22	58:39	66:54	75:07	83:20
29	Stoddard-Dayton	487	De Hymel	8:25	17:07	25:32	34:17	44:39	51:14	59:36	68:04	76:26	84:47
20	Mercedes	557	Jogersberger	8:54	17:58	26:43	35:35	44:25	53:36	62:22	71:09	79:50	88:34
9	Apperson	597	Geo. E. Davis	9:44	19:14	28:31	37:54	47:11	56:30	65:39	74:07	84:05	94:30
1	Apperson	597	H. Hanshue	9:31	18:47	Stripped Gear							
7	Stoddard-Dayton	487	Hugh Harding	8:47	23:47	Engine Trouble							

DIVISION 4C—FOR CARS WITH PISTON DISPLACEMENT RANGING

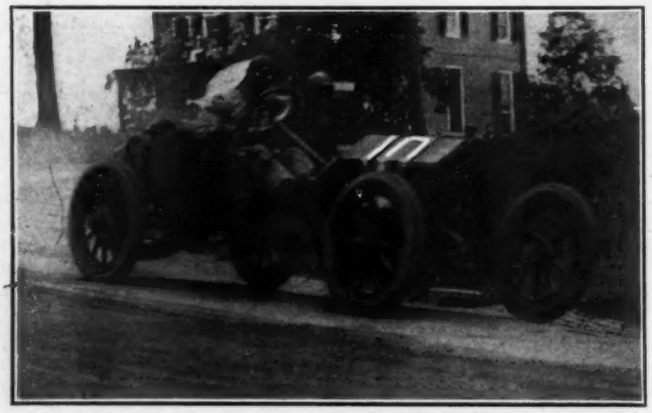
3	National	447	J. D. Aitken	9:01	17:46	26:26	35:07	43:54	52:47	61:33	70:16	79:10	88:23
14	Jackson	354	Harry Cobe	9:06	17:58	26:58	36:22	45:31	55:04	64:10	73:30	82:36	91:51
23	Westcott	354	H. C. Knight	9:11	18:37	27:27	36:50	46:01	55:07	64:09	73:12	82:14	91:12
11	Marmon	318	Harroun	12:05	21:20	29:55	40:02	48:22	57:15	66:04	74:50	83:32	92:11
17	Benz	444	Willie Haust	20:02	28:25	37:22	46:	54:40	63:14	71:51	80:28	89:12	97:48
16	National	449	H. S. Wilcox	8:54	17:49	26:42	37:49	47:08	60:51	72:19	81:01	89:38	98:16
26	Benz	448	Ed. Hearne	8:58	33:53	43:36	53:03	64:34	75:58	85:38	95:23	109:57	Ignition
30	Benz	449	C. A. Bergdoll	Lost Gasoline Cap									

DIVISION 3C—FOR CARS WITH PISTON DISPLACEMENT RANGING

10	Pullman	286	E. Gellard	9:43	19:12	28:38	37:59	47:19	56:47	66:	75:05	84:03	93:01
15	Mercer	300	H. P. Frey	10:12	20:57	30:39	41:24	51:30	61:34	71:41	81:41	91:38	101:25
32	Otto	253	Frank Yerger	12:57	23:05	33:08	43:05	53:	67:47	77:52	87:44	97:41	111:03
28	Marmon	299	Dawson	8:43	17:43	26:15	35:04	43:58	52:45	61:29	70:08	78:46	87:22
31	Corbin	270	Matson	9:25	19:17	30:27	Magneto						
8	Pullman	286	H. Hardesty	11:49	Twisted Pump Shaft								

DIVISION 2C—FOR CARS WITH PISTON DISPLACEMENT RANGING

21	Abbott-Detroit	213	V. P. Padula	11:28	22:23	33:10	44:	54:43	65:25	76:07	86:41	97:18	107:40
2	Abbott-Detroit	213	Mort Roberts	10:43	19:53	29:46	39:39	49:33	59:32	69:29	79:30	89:24	99:18
24	Ford	201	Frank Kulick	9:47	19:54	29:06	39:14	55:21	64:46	74:16	83:41	115:22	124:50
18	Cole	201	H. Endicott	9:52	20:07	29:24	40:01	50:03	60:02	70:05	80:03	89:52	99:54
27	Cole	201	Bill Endicott	10:27	20:54	Broke Pinion in Steering Gear							
6	Abbott-Detroit	213	Mort Roberts	11:42	30:20	Ignition							



Pullman, No. 10, at Sweet Briar Mansion

Lozier was quite as good, when it is remembered that the winner had the advantage of 161 cubic inches piston displacement. Stoddard-Dayton, No. 29, driven by De Hymel was third, about 8 minutes later, and National, No. 3, Aitken, the same car that finished third in the Vanderbilt cup race, was fourth, five minutes behind the Stoddard. Five others finished the full course as follows: Mercedes, Jackson, Westcott, Pullman and Apperson.

Eight out of the nine cars that finished were stock models of American make, emphasizing the lesson taught in the running of the Vanderbilt Cup. The foreign racing machines experienced bad luck or something else, for they failed to stand up.

The race was a beautiful contest. It was managed and administered with skill and fairness. It was witnessed by fully half a million persons and not a single spectator was even frightened, so perfect were the policing arrangements. Neither were there any sanguinary accidents to the contestants, although several of the cars met with mishaps and two mechan-

icians suffered broken arms. The course is comparatively slow on account of the numerous hazards along the winding eight-mile route.

Besides winning the grand prize of $2,500, the Chadwick also wins its class prize in Division 6C, amounting to $1,000 and a silver trophy presented by the city of Philadelphia. In addition there were the usual number of accessory prizes.

The race was really five races in one for there was a cash prize hung up for each division under Class C from 2C to 6C. The prizes were $1,000 each and a silver trophy given by the city.

The Chadwick was the only contestant in its class to finish the course, all the others meeting mishaps.

The Lozier won in its class, Division 5C, but three others finished in that division.

National, No. 3, Aitken, won the division 4C honors, but two others completed the full route.

Pullman, No. 10, driven by Gellard was first in Division 3C.

The Abbott-Detroit, No. 21, driven by Padula was the winner

National, No. 3, passes the Smith Memorial

ANNUAL 200-MILE FAIRMOUNT PARK RACE, WITH THE WINNERS IN EACH OF THE FIVE CLASSES.

FROM 601 TO 750 CUBIC INCHES—WON BY THE CHADWICK, NO. 12

11th Lap	12th Lap	13th Lap	14th Lap	15th Lap	16th Lap	17th Lap	18th Lap	19th Lap	20th Lap	21st Lap	22nd Lap	23rd Lap	24th Lap	25th Lap
88 Miles	96 Miles	104 Miles	112 Miles	120 Miles	128 Miles	136 Miles	144 Miles	152 Miles	160 Miles	168 Miles	176 Miles	184 Miles	192 Miles	200 Miles
13:29	101:42	109:55	118:10	126:18	134:26	142:23	150:37	158:46	**166:50**	**174:57**	183:09	**191:22**	199:31	**203:07.88**
90:35	98:40	107:01	115:17	123:32 Broke Oil Feed										

FROM 451 TO 600 CUBIC INCHES—WON BY THE LOZIER, NO. 4

91:33	99:45	107:57	116:09	124:24	**132:39**	**140:51**	**149:08**	**157:26**	166:53	175:08	**183:06**	191:23	**199:22**	209:13.30
93:10	106:42	114:47	126:09	134:51	143:07	151:53	160:09	168:25	176:41	184:53	193:02	201:12	209:24	217:42.95
97:37	108:22	116:58	125:38	134:17	142:53	151:23	159:51	168:44	180:08	188:55	197:30	206:05	214:41	223:18.74
103:50	112:58	122:08	131:20	140:36	150:03	161:50	171:10	188:15	197:25	206:39	216:01	225:19	234:29	243:12.05

FROM 301 TO 450 CUBIC INCHES—WON BY THE NATIONAL, NO. 3

97:19	106:13	115:02	123:57	132:57	141:47	150:36	159:27	168:22	177:13	186:11	195:16	204:13	213:18	222:20.75
100:58	110:01	119:15	128:12	137:07	146:04	155:04	163:59	172:59	181:56	190:50	199:42	208:37	217:28	226:13.16
100:07	109:09	118:06	127:05	136:01	144:55	155:38	164:36	175:14	184:18	193:15	202:14	211:09	220:08	232:44.87
101:53	109:31	118:29	150:50	160:30	170:08	179:38	191:15	201:04	210:39	220:25	229:55	239:28 Running		
106:23	115:06	123:51	132:33	141:20	150:23	159:02	167:38	176:09 Stone in Shifting Quadrant						
107:01	115:43	126:31	135:06	143:35	152:05	160:44	170:39 Radiator							

FROM 231 TO 300 CUBIC INCHES—WON BY THE PULLMAN, NO. 10

102:	110:53	119:49	129:54	139:06	148:22	157:49	167:27	177:05	186:32	196:10	205:46	216:40	226:59	237:04
111:	120:34	130:07	139:39	149:08	161:43	171:18	180:51	190:20	199:56	209:36	219:11	228:49	238:22 Running	
121:06	131:08	141:10	151:13	163:26	173:41	183:47	193:52	205:09	215:10	225:09	235:18 Running			
96:15	104:59 Broke End of Housing Rear Axle													

FROM 161 TO 230 CUBIC INCHES—WON BY THE ABBOTT-DETROIT, NO. 21

118:18	128:49	139:17	149:53	160:25	172:31	183:05	193:25	204:03	214:27	224:50	235:27 Won Its Class Running at Finish
109:22	119:19	129:13	139:13	149:08	159:10	169:04	179:06	189:06	199:05 Threw Wheel		
134:27	143:57	153:24	162:55	172:51	184:22	197:05	206:40	216:06	225:46 Disqualified, 4 Men Changing Wheel		
109:43	119:52	130:57	143:19	151:43	162:07	172:58	193:25 Broke Spring Leaf				

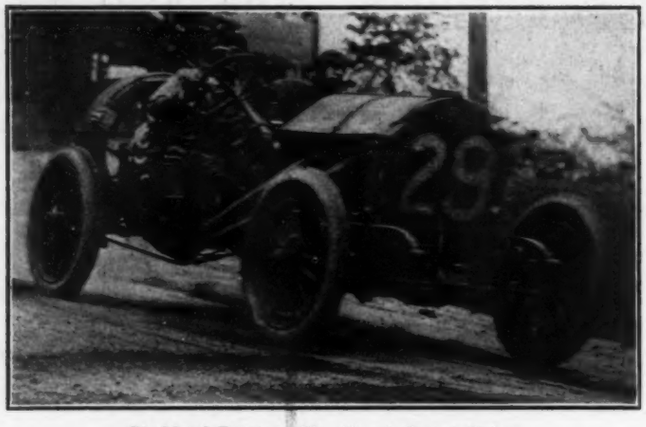
in Division 2C, but did not have to make the full distance as the car was the only one running in that division when the race was declared finished.

The story of the race by laps is rather complicated because of the fact that there were so many factors to be considered.

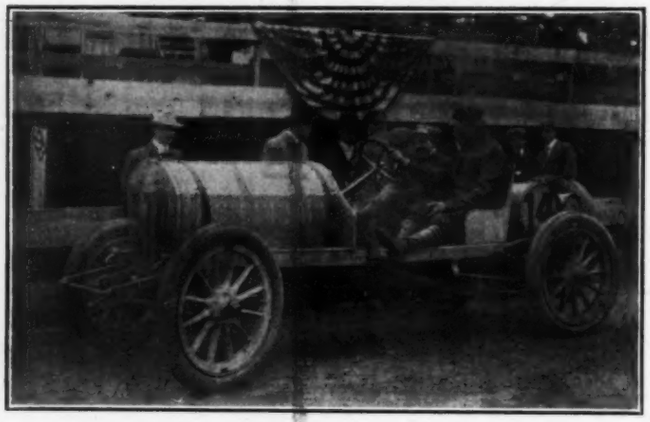
Starter Gantert made as perfect a job of getting the thirty-two cars away from the starting line as has ever been seen on a race course. The Apperson, No. 1, was first away and the Otto last, 5:10 after Hanshue's mount. Each car was given ten seconds headway. The fairness, exactness and perfection of the start was generally commented upon. Chadwick 25, led in elapsed time at the end of the round, in the fast time of 8:10. The Lozier was first to make the trip, leading past the stand, but its time was 8:32. Chadwick, 12, was third, a shade faster than the Marmon, 28, but both were credited with 8:43. National, 16, led in its class and Ford, 24, showed the way for the small cars.

The Lozier assumed the lead in the second round with Stod-

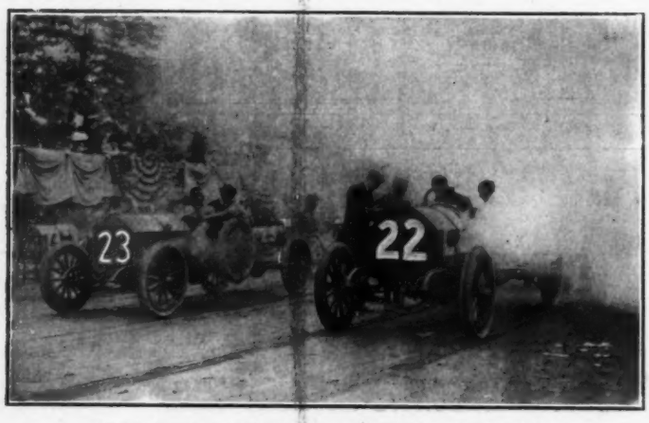
Abbott-Detroit car, No. 21, on Sweet Briar Hill



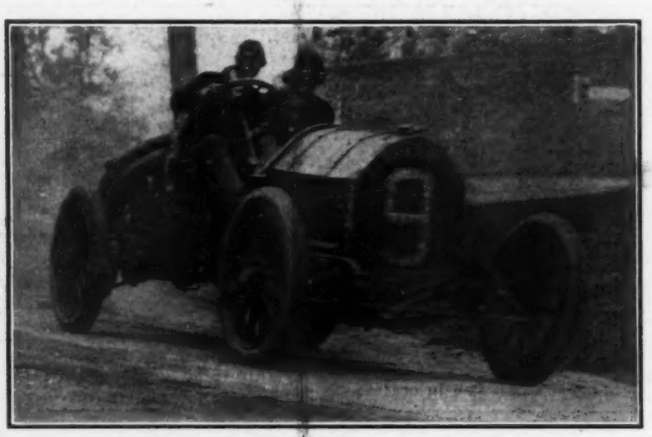
Stoddard-Dayton, No. 29, at Sweet Briar



Jackson car, with Cobe at the wheel



Simplex, 22—Beardsley; Westcott, 23—Knight



Apperson, No. 9, rounding into the Concourse

dard-Dayton, 29, Benz, 5, and Chadwick, 12, tied for the place positions.

In the third round, Chadwick, 25, regained the lead and held it for three laps, closely pressed by the Benz, 5, and the Lozier. In the sixth round Chadwick, 25, driven by Mitchell, was eliminated by plunging off the course and striking an embankment.

Benz, 5, driven by E. R. Bergdoll, went to the front in the sixth round and from there to the end of the fifteenth lap it set a fast pace, running about a mile a minute. At the end of that round it was leading the Lozier by 52 seconds; with the Chadwick, 12, in third place. National, 3, was fourth in point of speed and led its class by a wide margin. The Marmon that had run second in the Vanderbilt Cup had met with a mishap in the thirteenth round and the Pullman 10, had established a winning lead in Division 3C. Abbott-Detroit, 2, led Cole, 18, in their class. Marmon, 11, broke the lap record in the twelfth round with 7:38.

In the next round, the Benz broke an oil feed and was withdrawn, leaving the Lozier out in front with a comfortable lead over the Chadwick, 12. From this point to the finish it was a duel between these two such as has been rarely witnessed. For four laps the Chadwick gradually reduced the margin of about two minutes, and in the twentieth round it finished with an advantage of three seconds. It stayed in front through the next lap, but in the following round the Lozier got into the van once more, with three seconds to spare. The Chadwick seemed to have something in reserve, for whenever it reached the lead, the driver was signaled to take it easy. Nevertheless he was forced to make some exceedingly fast rounds at this stage through the beautiful steady speed of the Lozier. Lap 22 found the Lozier in front, but in the next round the Chadwick was ahead by one second. Lozier made the twenty-fourth lap in less than eight minutes and led its rival by nine seconds at the tape.

At the beginning of the last lap there were still thirteen cars left in the race, and word was given that enough cars would be given a free course to finish as would be necessary to decide upon a winner in each class. As has been said, the Chadwick won the grand prize and its class in record-breaking time, but the race was not called off until Abbott-Detroit, 21, had finished 22 laps and was running perfectly, without any opposition.

The National, winner in Division 4C, ran steadily and well throughout. The Westcott, 23, completed the full course in this division as did also the Jackson, 14.

Pullman, 10, was the only car to finish in Division 3C, but Mercer, 15, and Otto, 32, were both running perfectly at the end.

The Abbott-Detroit, winner of the 2C prize and trophy, had a stormy passage. Both Cole entries succumbed to mechanical troubles before the end and the Ford was disqualified for using four men to replace a wheel in lap 20. Abbott-Detroit, 6, had dropped out early with ignition troubles and Abbott-Detroit, 2, had shed a wheel while far in the lead in lap 20. This left Abbott-Detroit, 21, a certain winner, and when the victors in the larger class had been determined, Padula was given the checkered flag while still three laps from home.

The race was conducted as usual by the Quaker City Motor Club. Harry C. Harbach, secretary, was responsible for the preliminary arrangements, all of which worked out to a mathematical nicety. The timing, scoring, starting, judging and everything connected with the race was well done in an orderly manner. The police arrangements would command admiration anywhere. The technical committee, under the supervision of A. L. McMurtry, was quick and decisive in its actions. In order to show how carefully the committee did its work, it may be cited that the winning Pullman car was given the white flag in one of the later rounds by Mr. McMurtry, when it was noted that a tire carrier was dragging from the rear springs. At the time the car was struggling for the lead in its class and this peremptory action might have caused it to lose. But the committee figured that it is better to be safe than sorry, and the Pullman had to stop and adjust the dislodged part and won anyway. R. E. Ross was referee. Something like $11,000 was realized for charity by the sale of grandstand seats and concessions.

1910 Edison Storage Battery

FIRST INSTALLMENT—WALTER E. HOLLAND DELIVERED A PAPER BEFORE THE TWENTY-SIXTH ANNUAL MEETING OF THE ASSOCIATION OF EDISON ILLUMINATING COMPANIES HELD AT FRONTENAC, THOUSAND ISLANDS, N. Y., SEPTEMBER 6, 7 AND 8, 1910, OF WHICH THIS IS AN ABSTRACT

ANNUALLY the Association of Edison Illuminating Companies meet for the purpose of reviewing the past and outlining the future for the good of the service. Among the problems that have to be coped with is the "peak load" as it relates to the long hours during the day when the machinery that is necessary to cope with the "peak load" lies in idleness, or at least operating far below rated capacity. Any demand of sufficient moment to serve as a loading factor that can be so regulated that it will come during the long hours of the day, excepting at the time of peak loading, presents unusually attractive possibilities, and it is on this account that the central stations throughout the land look to the electric vehicle with a favorable eye.

In the presentation of this paper, Walter E. Holland, of the Edison Storage Battery Company, owing to his great familiarity with subjects akin to the central station problem, mindful of the possibilities of the new Edison storage battery, and appreciating the professional keenness of his audience, presented relating matter in concise and technical form, some of which will scarcely be of immediate interest to automobilists in general, but an attempt will be made here to differentiate sufficiently to permit readers of THE AUTOMOBILE to arrive at some of the reasons why the time taken to develop the Edison storage battery to its present state of perfection was not unduly long, especially if it will be remembered that M. Gaston Planté started out to commercialize lead-lead batteries in 1861, and a coterie of eminent physicists worked upon the problem from that day to this, notable among whom mention will be made of Emil Fure, who brought out his modification of the lead-lead battery in 1879, not forgetting that Brush patented the paste, paint, or cement idea in 1881; and it is this modification of the lead-lead battery that ultimately became prominent in electric vehicle work, it being the case that the original Planté type of battery would scarcely deliver more than three to four watts per pound, and it was a great stride in the direction of commercial acceptability when Charles F. Brush introduced modifications that made it possible to realize as much as eight watts per pound of elements on a sufficiently stable basis to render the electric vehicle a factor, despite the wonderful possibilities that reside in the internal combustion motor as it is at present used in gasoline automobile work.

Thomas A. Edison, with his customary penetration, tersely points out that the first thing to do in the final solution of the electric vehicle problem, assuming that the battery is available, is to establish a charging plug outside of the door, in an accessible position, of every electric central station in America. As Mr. Edison said, "The charging facilities must come first; the automobilist will decline to put his money into a vehicle that cannot be charged with certainty at a sufficiently large number of points along the road to serve his purpose." Mr. Edison also said: "Central station managers everywhere have the capacity for charging vehicle batteries as a by-product, and the cost to them of building a 'lean-to' to serve as a protecting shed for automobiles when they come to be charged, together with the cost of installing charging plugs, is so slight, and the advantage is so obviously great, that it is a mere matter of telling them about it to get them to fall into line."

One of the great advantages of annual meetings of the managers of central stations lies in the concerted action that can be taken when the propitious time arrives, and Mr. Edison made the point that it is now only a matter of a few brief months when charging facilities will be afforded by the small central stations in the little hamlets betwixt great centers, as well as at the larger stations that now cater to the automobilist and find him a profitable customer because he comes for his "charge" and takes away a by-product.

Among the many other interesting points that were brought out at a recent interview, the rather naive way that Mr. Edison took advantage of in offering a broad justification for the future of the electric vehicle may appeal to the automobilist, who, while perfectly satisfied with himself and the position he occupies, may not be averse to having his intellect tickled by the inference that there must be something in it since gasoline costs $32 per ton, and steaming coal, such as is used by central station companies, is at a premium price when the cost is one-eighth of the price of gasoline.

The central station man has in his possession two fundamental reasons why he can afford to make concessions to the automobilist who wants a charge for his battery. The first reason is that he has his machinery lying in idleness (90 per cent. of it) 22 hours out of every 24. The second ground for his interest presents itself when the fact is taken into account that what the central station man really sells is the energy that he abstracts from coal, putting it in the form of electricity, the cost of which to him is represented by the cost of the coal per ton, plus the money he puts into it in making the conversion from the energy as it resides in coal to the electric energy that he pours into the battery when the automobilist comes for his charge. It would be a far stretch of the imagination were the incidental costs which must be added to the initial cost of the coal to expand sufficiently to make heavy inroads into the ton price of gasoline. The margin is insurmountably wide and the central station man

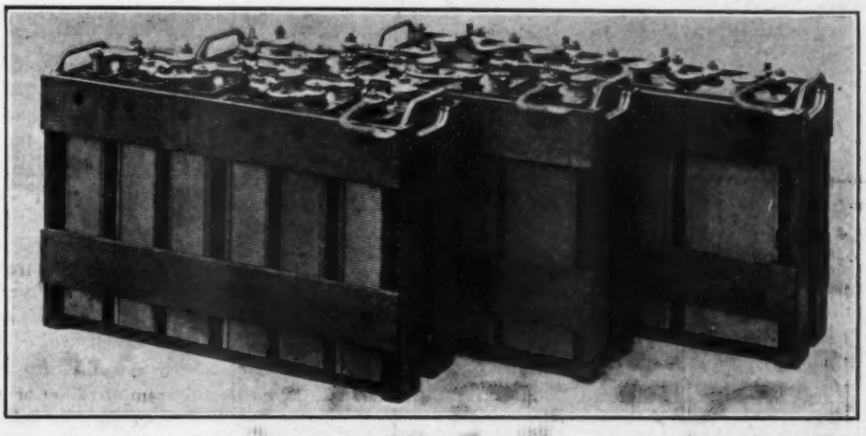


Fig. 1—The Edison vehicle battery, showing how six cells of battery are joined and assembled in crates

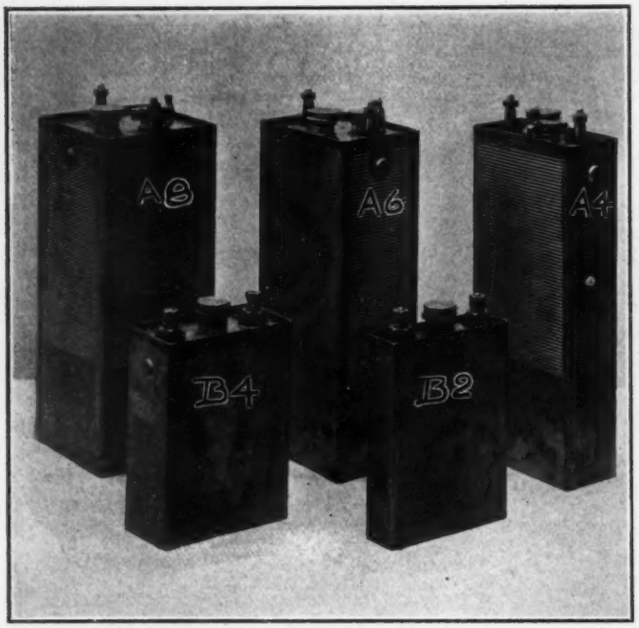


Fig. 2—Showing the five sizes of cells, as used in general service, transportation, lighting and ignition work

is in a position to compete with gasoline, and as Mr. Edison concluded, when he said, "it puts the whole burden on the battery—with a good battery that will not wear out, there is nothing left but to bask in the sunlight of prosperity."

Many Obstructions Put in the Way of the Battery

Keeping in mind the difference between batteries as used in central station work and the battery problem as it is slowly being worked out for transportation purposes, it is more to the point to clearly state the impeding influences and indicate how they are being coped with than it will be to simply assume that a battery with a satisfactory output per pound of material used will serve for vehicle purposes, disregarding the thousand and one other things that stand in the way of success. There is more significance to be attached to Mr. Edison's process of elimination than rightfully belongs to the fact that Mr. Edison as an inventor of repute has patented and is commercializing a type of storage battery.

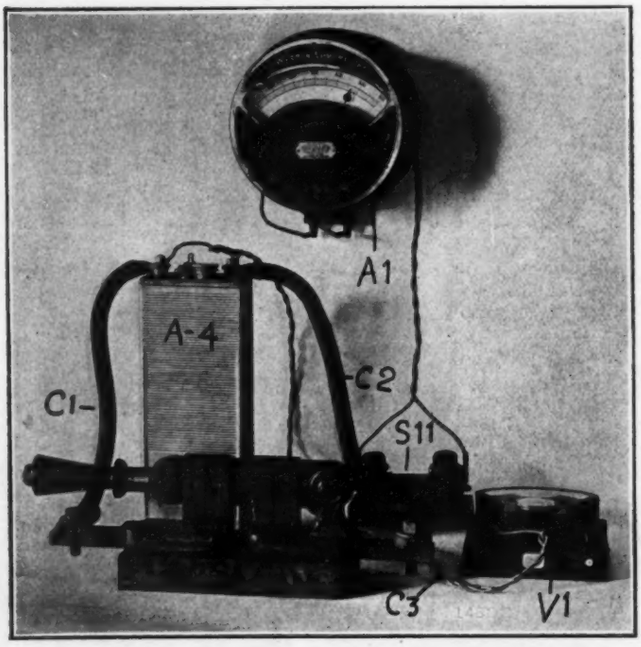


Fig. 4—Apparatus used in short-circuiting test

The history of the patent offices in the various civilized countries is largely composed of that character of historical material that clearly describes all the generic types and modifications of storage batteries that have failed to do satisfactory vehicle work. "The proof of the pudding lies in the eating of it." There are two parts of this pudding that would induce acute indigestion for the eater. The most conspicuous part of the moment is in the guise of the relatively large number of gasoline automobiles in proportion to the relatively small number of electric vehicles to be had. The second consideration takes into account the enormous amount of money that has been wasted in storage battery work and the relatively poor results obtained therefrom.

When Mr. Edison states that the future of the electric vehicle is clearly incumbent upon the battery he reiterates a situation that history proves, not forgetting, however, that there are so many good things to be said in favor of electric vehicles that despite storage battery imperfections they have survived and are looked upon by the average autoist as entirely satisfactory under certain conditions, approximately competitive under other conditions, leaving it for the storage battery in its final perfected form to extend their radius of travel and place at the disposal of those who desire to tour, using electric vehicles that will take them where they want to go, means of obtaining a charge at the end of each day's run wherever they happen to be.

A very significant statement made by Mr. Edison may be restated as follows: "When the storage battery reaches a state of perfection where it will furnish all the energy required to propel a car for a whole day there remains nothing to be desired." Obviously, a tourist who wants to keep on the go day and night will find a Pullman car much more to his liking. Moreover, there is no profit to be derived from the supplying of automobiles to men who want more than can be a reasonable expectation from even a railway locomotive. In railway work the locomotives are treated with precisely the same consideration as a horse—when they do their allotted work per day they are groomed, stalled and permitted to rest. Unless the men who use electric vehicles can be brought to understand the reasons why even locomotives are treated with the consideration that is accorded a horse, it is not profitable to do business with them.

Narrowing the discussion down to the specific differences between the conditions of service that storage batteries render in central station work as compared with that of transportation, it must first be pointed out that in central-station battery service the batteries are installed under the most precise conditions in well-lighted and properly ventilated rooms, and experts attend them day and night, year in and year out, giving them a precise charge at the right moment, as indicated scientifically with instruments of precision designed for the purpose and performing all the other duties as based upon electrochemical considerations that experience has proven to be efficacious in the prolonging of life, limiting the delivery of current to that which is good for the battery from the life point of view, rather than to compel the battery to serve under severe conditions.

Turning the attention to transportation service for the moment, it is simple to point out that the installation is made in a vehicle that has to negotiate all sorts and conditions of roads under speed variations that are only under the control of men who entirely disregard everything but the point, *i.e.* they wish to go somewhere, or they are on their way back. The battery is subjected to vibration, shock and jar, and the expert who watches the central station battery hour after hour and utilizes instruments of precision for determining everything about it is far away. The great primal consideraton is entirely lost sight of; instead of the battery being limited in its output to that which is good for it from the life point of view, as in central station work, it is required to furnish all the current that is necessary under operative road conditions, entirely disregarding its rated capacity, or the state of its charge.

(*Continued on page 644*)

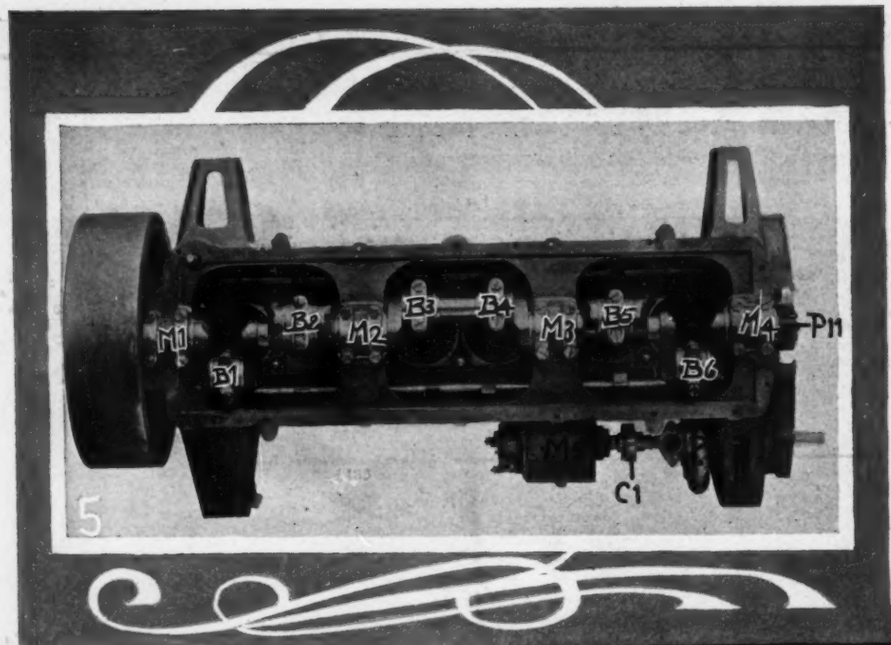
Among the Makers

THE PREMIER LINE FOR 1911 BEARS EVIDENCE OF MANY REFINEMENTS—THE ACME S. G. V. FOR NEXT YEAR A DISTINCT INNOVATION—THE ROADER CAR A NEWCOMER

IN THE FOUNDRY DEPARTMENT OF THE RAMBLER SHOP AT KENOSHA, WIS.

MARKET conditions are now quite cleared up; the bankers who were so much concerned a few weeks ago are quite calm, and from what can be seen by those who make a practice of looking below the surface the automobile situation is on a firmer basis than ever. For the benefit of those who may not have followed the situation closely it may not be out of place to point out that the makers are preparing in a serious way for the struggle that competition is bringing, but it is fortunate for the purchasing public that quality, instead of suffering, is bound to be improved, the reason for this lying in the preparing for better work.

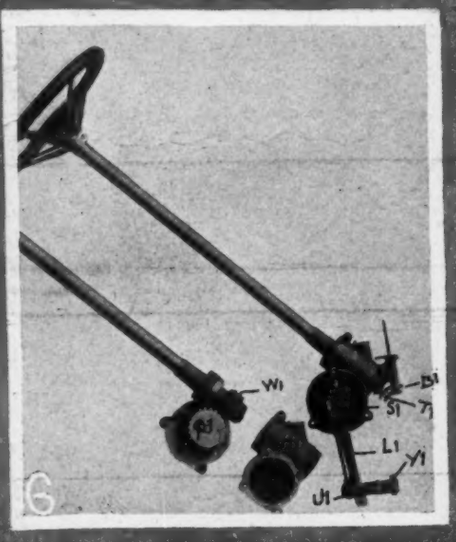
One of the most troublesome branches of the automobile business from the makers' point of view lies in the foundry problem. The procuring of good castings has caused many a maker to go abroad for them, and it has been found that the outside foundry is better able to cope with the "grate bar" problem than it is to turn out good cylinders. That which is true of cylinder castings is equally to be remembered when reference is had to aluminum castings, and the 1911 method of disposing of the troublesome feature attending is to own and operate a foundry in connection with the making of the automobiles.

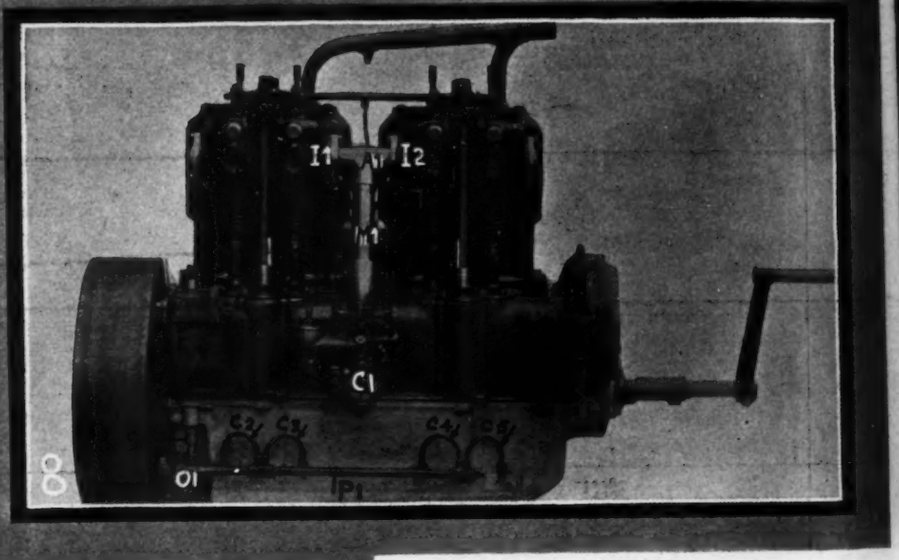


1911 Premiers

TAKING advantage of experience, utilizing the broad foundation which resulted in the Premier car as it is now generally understood, the 1911 models are offered by the Premier Motor Manufacturing Company, Indianapolis, Ind., subject to the refinements of a year, retaining the general plan, and the mechanisms that have proven to be the most substantial. As the table on another page shows, the 4-40 model affords five options, beginning with the "Touring Clubman," including the Limousine and Roadster, while the 6-60 model is in four options beginning with a "Clubman," including Roadster, Touring and Limousine models. The general appearance of the finished cars may be gleaned from a study of Fig. 1, which is a front view of the 6-60 Touring car; Fig. 2, which is the 4-40 Touring car, three-quarter view, and Fig. 3, which is a side view of the 6-60 Touring car, and it will be observed that all three models of this car are of the latest and most approved fore-door designs, with overhanging cowl and a dashing effect generally.

From a mechanical point of view, the several models have a certain similarity; it has been found that a principle that works well in one model is good for the





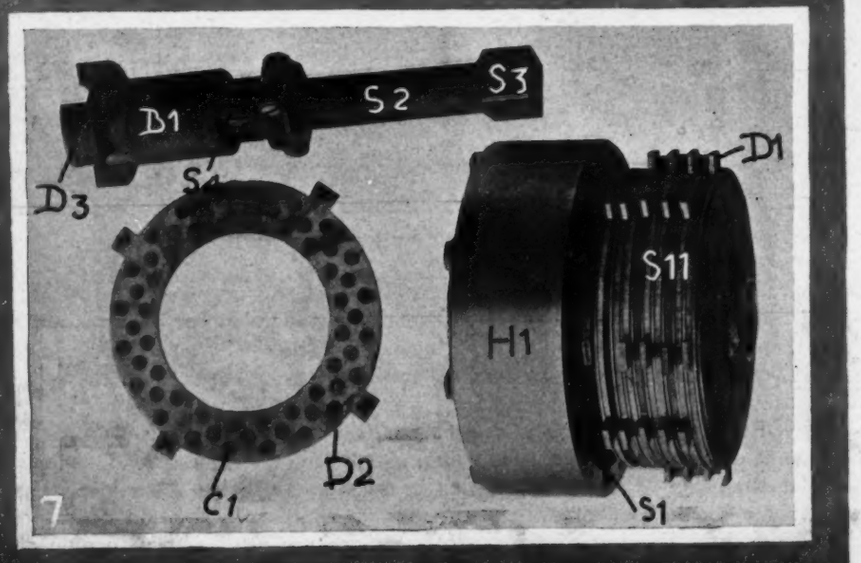
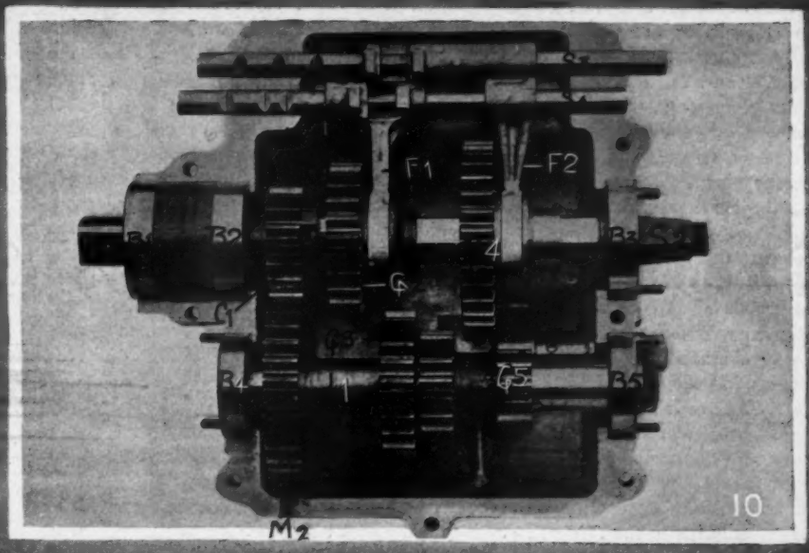


Fig. 5—Six-Sixty motor turned upside down, with lower half removed
Fig. 6—Worm-and-sector type of steering gear with the parts removed
Fig. 7—Presenting the multiple-disc clutch, clutch shaft and housing
Fig. 8—Right side of Four-Forty motor

INCLUDING 4-40 FOUR-CYLINDER AND 6-60 SIX-CYLINDER MODELS

other, and Fig. 4 is offered as an illustration of the general plan mechanically, this being of the 4-40 model showing the motor M1, flywheel F1, multiple disc clutch C1, clutch control shaft S1, clutch pedal P1, service brake pedal P2, transmission gear G1, control shaft S2, steering gear G2, transmission side lever L1, and an emergency brake lever L2. Attention is called to the width of flanging F2 of the chassis frame, at the point of narrowing, also to the depth of the frame and the use of pressed steel footboard irons I1. It will be to the point to



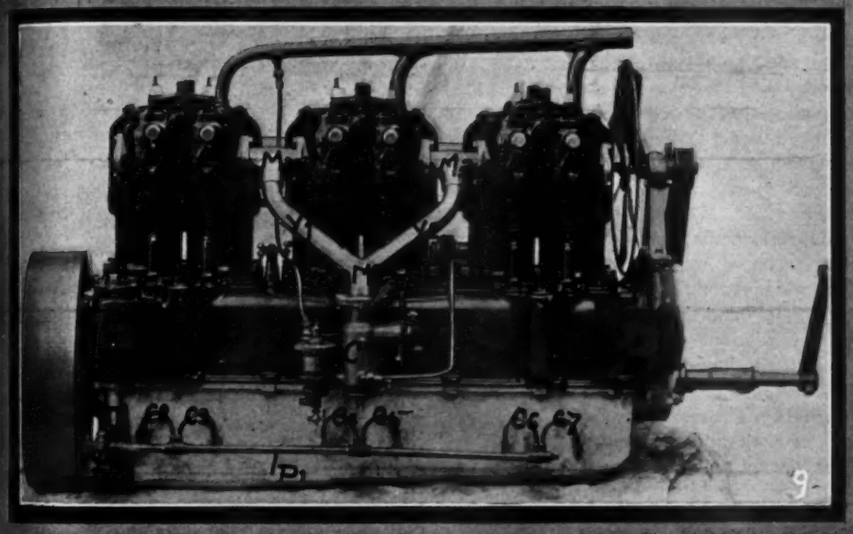
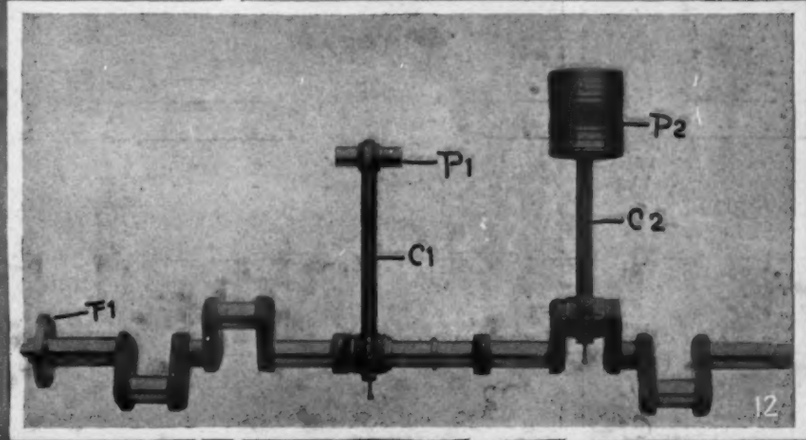


Fig. 9—Looking at the right-hand side of the Six-Sixty motor
Fig. 10—Looking into the three-speed and reverse selective transmission gear
Fig. 11—Details of the brakedrum and brakeshoes on live rear axle
Fig. 12—Crankshaft of the Six-Sixty motor

observe how the lateral L3 is fastened to the side member at the point L4, utilizing a secondary stiffener from the lateral L3 forward to afford a substantial platform for the machinery equipment.

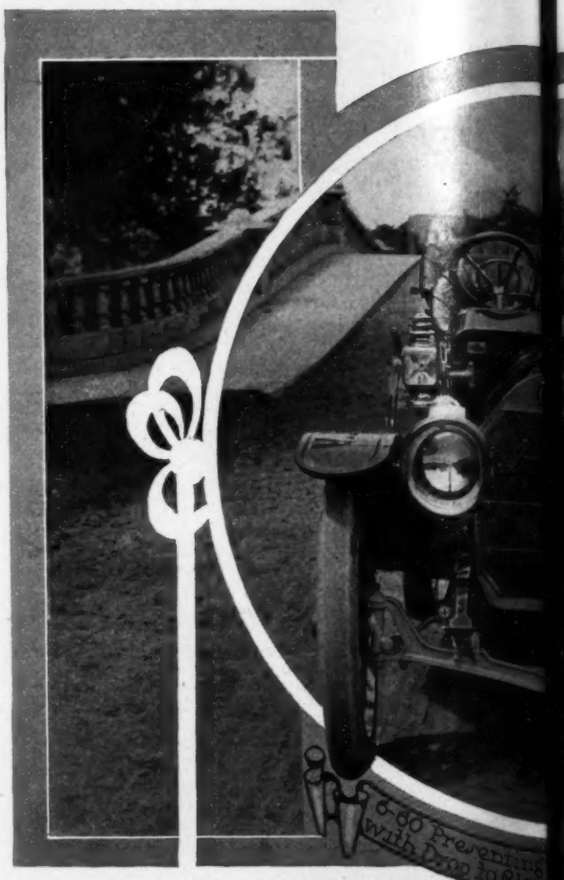
With the general arrangement and scheme of design fixed in the mind's eye, it will be in order to take up with the mechanical detail in which the 4-40 has two pairs of cylinders with a bore of 4 1-2 inches and a stroke of 5 1-4 inches. The 6-60 is provided with three pairs of these cylinders. The only difference then between the 4-40 and the 6-60, from the cylinder point of view, lies in the use of six cylinders instead

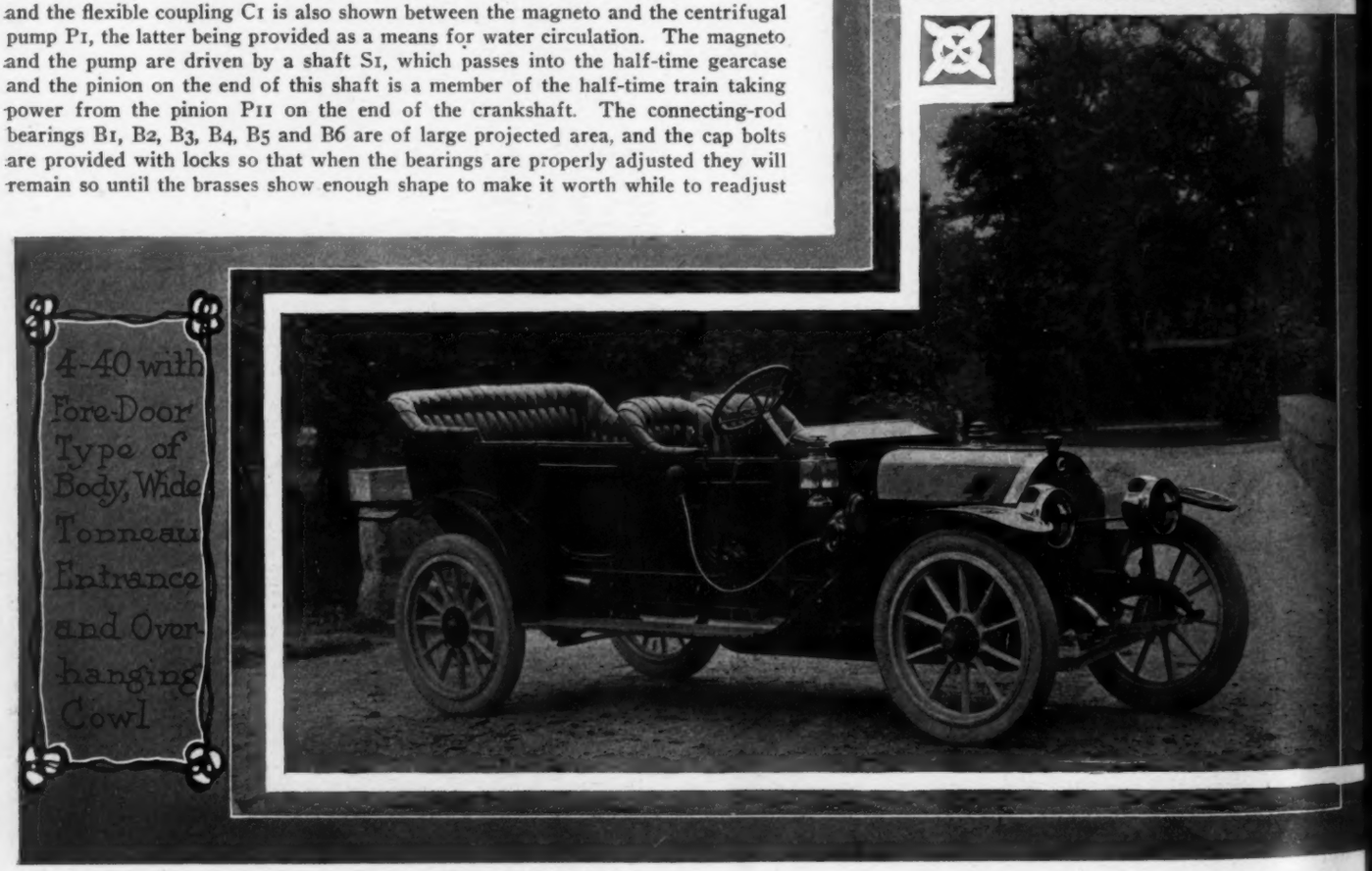


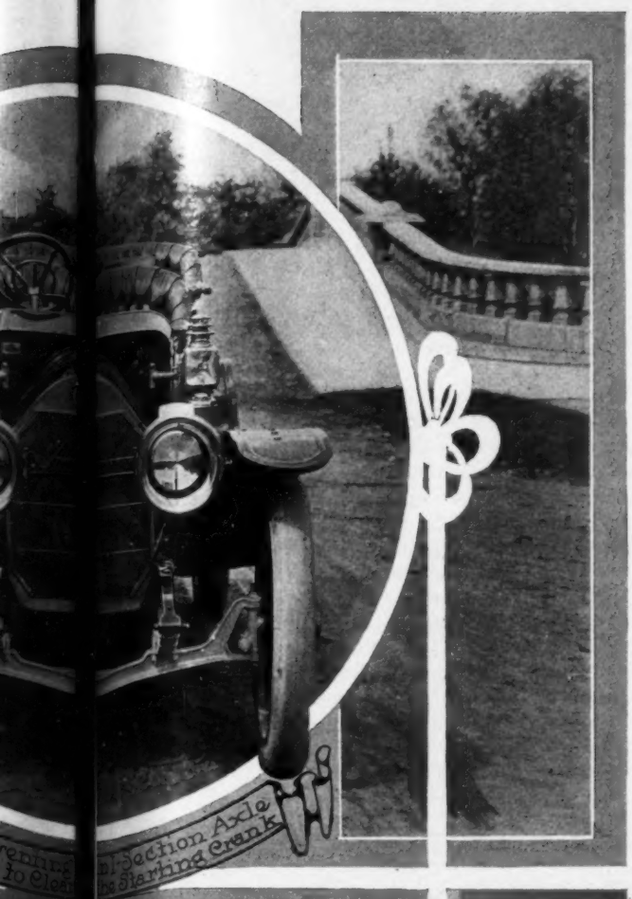
of four. The general appearance of the 4-40 motor is shown in Fig. 8, looking at it from the right-hand side, with a Wheeler & Schebler carbureter C1 located in the mid position, and the manifold M1 leading straight up to an accommodation piece A1, placed between the two pairs of cylinders, flanging to the sides of the intakes I1 and I2, thus making the intake non-tortuous, and particularly adapted for the good work expected of it. The oil pump O1 also shows on this side of the motor with the surplus of oil carried in the lower half of the crankcase, below the level of the pipe P1, and the connections C2, C3, C4 and C5 transfer the oil from the pipe P1 to the respective oilways within, whence the oil is distributed to all the bearing surfaces. This system of lubrication is known as "the return circulating system," and the pump O1, which is driven by means of a gear on the camshaft, with a vertical shaft and a sleeve connection at S1, is of the centrifugal type, while the oil supply in the lower half of the crankcase is equal to about three gallons, and it has been found in practice that the miles per filling of the lubricant is between 500 and 750. There is a sight-feed glass on the dash, which serves as a tell-tale, and the lubricating oil is poured into the lower half of the crankcase through a large opening in one of the crankcase arms.

Referring now to the 6-60 motor as shown in Fig. 9, the similarity of general design will be rendered at once apparent. The carbureter C1 is located in the mid position and the manifold M1 has a branch Y1 to the left, and a similar branch Y2 to the right, leading to a makeup M2 between the back two pairs of cylinders, and a similar makeup M3 leading up between the front two pairs of cylinders. Mixture is distributed to the respective cylinders through transfer ports within the twin castings, and this scheme of distribution of mixture has been found to eliminate the troubles that are generally threatening in connection with six-cylinder work. In the lower half of the crankcase just in front of the flywheel the oil pump I1 is located precisely as in the 4-40 motor, and the supply pipe P1 occupies a similar location with the distribution of oil to the respective feed points through the connections C2, C3, C4, C5, C6 and C7, the only difference being that there are two additional connections. The oil pump is driven by a vertical shaft to a gear from the camshaft; the oil is spilled into the lower half of the crankcase through a commodious opening in one leg.

Referring to Fig. 5 of the 6-60 motor, it is turned upside down with the lower half of the crankcase removed, showing the main bearings M1, M2, M3 and M4 with caps carrying the crankshaft on the upper half, thus freeing the lower half of any responsibility beyond excluding foreign matter and serving as a receptacle for the lubricating oil. In this view the location of the magneto M5 is brought out clearly, and the flexible coupling C1 is also shown between the magneto and the centrifugal pump P1, the latter being provided as a means for water circulation. The magneto and the pump are driven by a shaft S1, which passes into the half-time gearcase and the pinion on the end of this shaft is a member of the half-time train taking power from the pinion P11 on the end of the crankshaft. The connecting-rod bearings B1, B2, B3, B4, B5 and B6 are of large projected area, and the cap bolts are provided with locks so that when the bearings are properly adjusted they will remain so until the brasses show enough shape to make it worth while to readjust







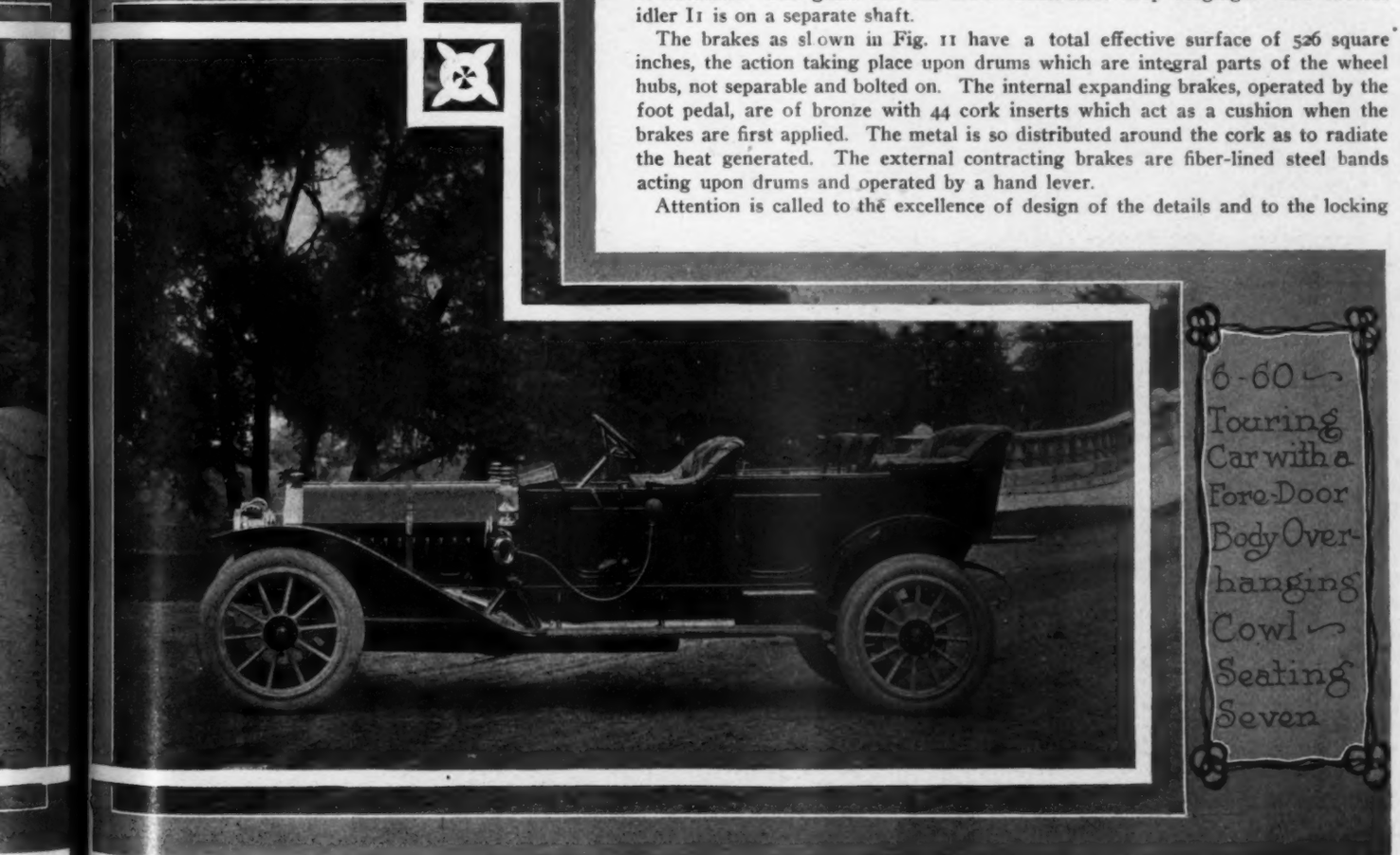
them, but the adjusting operation may be done with but slight labor. Fig. 12 shows the six-cylinder crankshaft removed from the crankcase, and presents one of the connecting rods C1 with the crosshead pin P1 integral, and another of the connecting rods C2 with a piston P2 attached, presenting to view the oil grooves at the lower extremity of the piston, and the piston rings at the upper extremity. The piston is backed off for a part of the distance in the region of the cross-head pin and attention is called to the fact that the construction is light, but care is exercised to afford the requisite strength to prevent deformation under service conditions. The crankshaft is flanged F1 for the flywheel, and the throws are very wide at right angles to the axis, which, together with the use of a fine grade of crankshaft steel and accurate finishing methods, including grinding, bespeaks continuity of service.

The multiple disc clutch is shown in Fig. 7, in which the housing H1 is provided with inverted splines S1 to accommodate the driving extensions D1 and springs S11 are placed between the respective discs for the purpose of separating them when the clutch is disengaged. One of the clutch discs D2 is shown at the left with cork inserts C1 occupying about 20 per cent. of the total area. The clutch shaft S2 has a square end S3 and integral splines S4 with a spline block B1 and integral dogs D3. There are 21 plates having cork inserts and the housing H1 is oil tight into which oil is placed for purposes of lubrication. Driving is done through the housing H1, so that the clutching members that have peripheral extensions engaging the slots S1 take the initial work, and the mating members transfer the load to the shaft S2 Fig. 7, thence to the transmission gear as shown in Fig. 10.

Referring to Fig. 10 of the transmission, it is of the three-speed and reverse selective type with a direct drive on high through the clutch C1, with master gears M1 and M2 imparting motion from the stub shaft S1 to the lay shaft L1, and when the gear G2 meshes with the gear G3 the drive is through M1 to M2, thence through L1 to G3, transferring to G2, and through the prime shaft S2 to the propeller shaft, live rear axle wheels to the point of contact of the tires with the road. To go into low gear, the sliding gear G4 engages the pinion G5 and the drive is through M1, M2, L1, to G5, transferring to G4, thence to S2 and back through the propeller shaft, etc. Sliding of the gears is accomplished by the selectors S3 and S4, using forks F1 and F2. Annular type ball-bearings B1, B2, B3, B4 and B5 support the spindles, which are relatively short and stubby so that deformation is obviated. The gears are cut from nickel-steel drop forgings. The reverse idler I1 is on a separate shaft.

The brakes as shown in Fig. 11 have a total effective surface of 526 square inches, the action taking place upon drums which are integral parts of the wheel hubs, not separable and bolted on. The internal expanding brakes, operated by the foot pedal, are of bronze with 44 cork inserts which act as a cushion when the brakes are first applied. The metal is so distributed around the cork as to radiate the heat generated. The external contracting brakes are fiber-lined steel bands acting upon drums and operated by a hand lever.

Attention is called to the excellence of design of the details and to the locking



wires L1 with castellated nuts N1 and limit stops S1 and S2, also the long bearing B1 and the drop-forged lever L2.

The steering gear is shown in Fig. 6, it being of the worm-and-sector type with a hardened worm W1 engaging the worm gear G1, enclosed in the housing H1 with a square end shaft S1, and a split hub drop-forged lever L1 with a universal joint U1 in combination with a yoke Y1 connecting with the drag rod. The workmanship throughout is on a high plane and lost motion is absent. The spark and lever control are cared for by means of a pair of beveled sets B1, connecting with a concentric rod and tube T1 leading to the spark and throttle levers on the top of the steering wheel, of Circassian walnut, mounted on a strong spider.

The power is delivered from the transmission to the rear axle by a cardan shaft of liberal size, equipped with two combination slip and universal joints which are packed in grease, and in use over extended periods have given entire satisfaction and excellent service. According to mechanical laws rotary motion can be transmitted uniformly only by two universal joints. At the ends of the driving or propeller shaft are found features of self-evident value, though they have rarely been used in motor cars. These are tapered squares which fit into tapered square holes in the universal joints, and to cut the latter from a solid block of metal was considered impossible until done by Premier engineers. The tapered square system gives a positive connection and is always sure to be of the proper tightness, and is a material advance over the use of a round tapered shaft with key and keyway. The torsion rod is of the double-tube type with the front end retained in a spring-cushioned ball joint.

SPECIFICATIONS FOR PREMIER

MODELS	Price	H.P.A.L.A.M.	BODY		MOTOR				COOLING		IGNITION		Lubrication
			Type	Seats	Cyl.	Bore	Stroke	Cyl. Cast	Radiator	Pump	Magneto	Battery	
Model 4–40.....	$3000	32.4	Tour'g*	4	4	4½	5½	Pairs..	Cellular..	Cent'fl...	High t§.	P'mpelly	Pump.
Model 4–40.....	3050	32.4	Tour'g*	5	4	4½	5½	Pairs..	Cellular.	Cent'fl...	Low t. . .	None....	Pump.
Model 4–40.....	3100	32.4	Tour'g*	7	4	4½	5½	Pairs..	Cellular .	Cent'fl...	Low t. . .	P'mpelly	Pump.
Model 4–40.....	4200	32.4	Limous.	5†	4	4½	5½	Pairs..	Cellular .	Cent'fl...	High t....	P'mpelly	Pump.
Model 4–40.....	2800	32.6	R'ster...	2‡	4	4½	5½	Pairs..	Cellular .	Cent'fl...	High t. .	P'mpelly	Pump.
Model 6–60.....	3500	48.6	Clubm .	2	6	4½	5½	Pairs..	Cellular .	Cent'fl...	High t....	P'mpelly	Pump.
Model 6–60.....	3600	48.6	R'ster...	3	6	4½	5½	Pairs..	Cellular .	Cent'fl . .	Low t. . .	P'mpelly	Pump.
Model 6–60.....	3650	48.6	Tour'g.	7	6	4½	5½	Pairs..	Cellular .	Cent'fl . .	Low t.....	P'mpelly	Pump.
Model 6–60.....	5000	48.6	Limous.	7	6	4½	5½	Pairs..	Cellular .	Cent'fl . .	High t....	P'mpelly	Pump.

*"Touring Clubman." † or 6 or 7. ‡or 3.

The rear axle is internally ribbed and needs no external truss rods. It is especially strong under the spring seats where the largest strain occurs, and ensures absolute alignment of bearings under all conditions. The differential is of the bevel gear type and upon it is mounted the main driving gear, which is adjustable laterally, and into it meshes the pinion which is adjustable longitudinally. Eight anti-friction bearings are used in the assembling. The pinion is forged solid with the shaft, contrary to the practice of keying it, and is mounted between two imported annular bearings instead of having both bearings on the front end and leaving the rear unsupported.

At the ends of the axle housing are the brake supports, rigidly attached and hot-riveted. The live axles have three integral large diameter clutch jaws which engage with three clutch jaws on the hubs of the wheels. A liberal annular bearing is placed almost in the direct load carrying center of each rear wheel.

The front axles are single-drop forgings of the Elliott type,

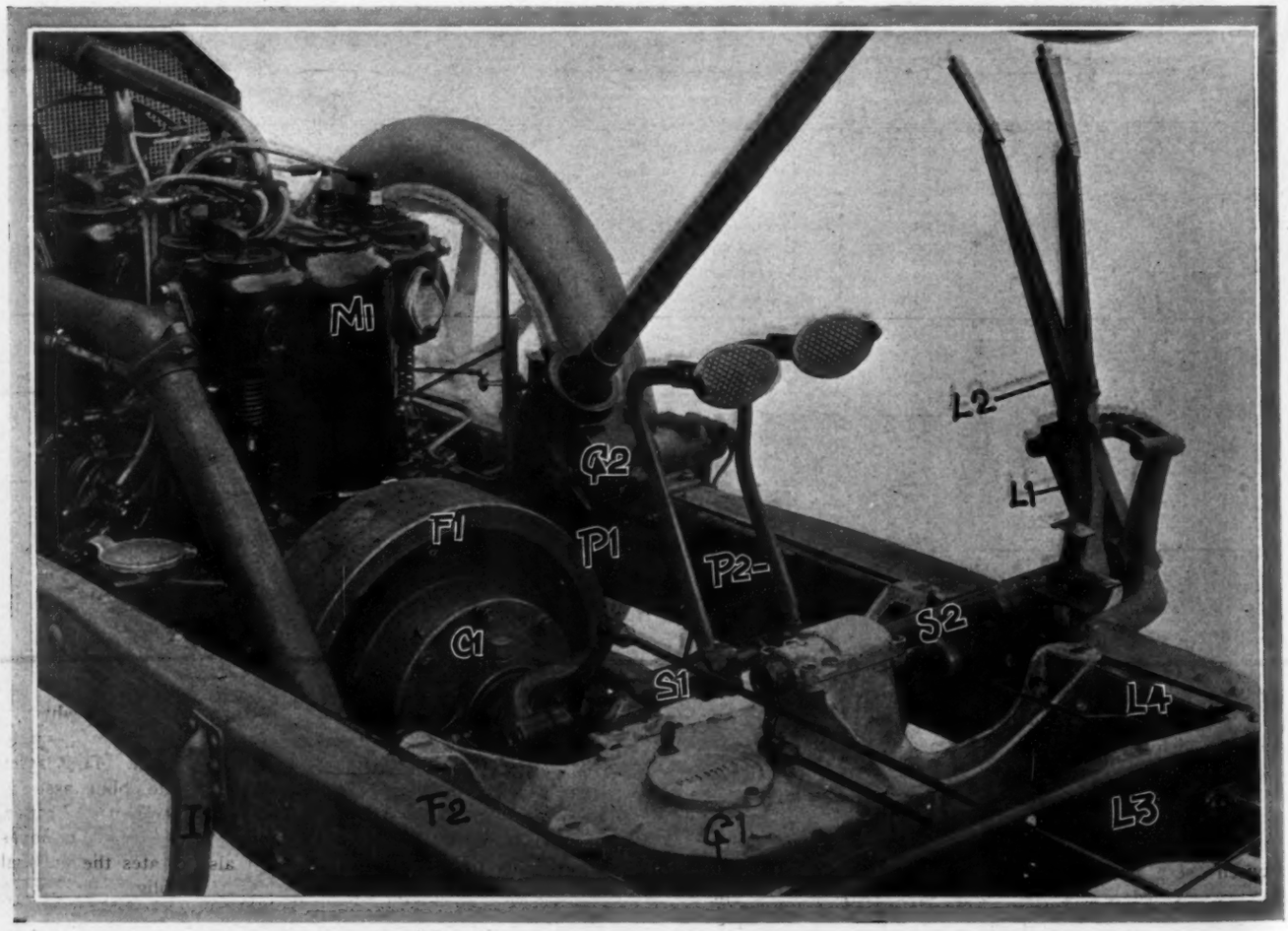


Fig. 4—Looking down on the chassis of the Premier 4-40, showing the location of the motor, enclosed multiple-disc clutch, suspension of the transmission, and strengthening of the frame at the point of narrowing

CARS AS OFFERED FOR 1911

Clutch	TRANSMISSION				Wheelbase	Tread	Frame	BEARINGS			Weight	TIRES	
	Type	Speeds	Location	Drive.				Crank-shaft	Trans-mis'n	Axle		Front	Rear
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	126	56½	P. Steel.	3 Plain.	5 Ball...	Ball & r	....	36x4½	36x4½
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	126	56½	P. Steel.	3 Plain.	5 Ball..	Ball & r	....	36x4½	36x4½
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	126	56½	P. Steel.	3 Plain.	5 Ball..	Ball & r	....	36x4½	36x4½
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	126	56½	P. Steel.	3 Plain.	5 Ball..	Ball & r	....	36x4½	36x4½
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	126	56½	P. Steel.	3 Plain.	5 Ball..	Ball & r	....	36x4½	36x4½
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	140	56½	P. Steel.	4 Plain.	5 Ball..	Ball & r	....	36x4½	36x5
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	140	56½	P. Steel.	4 Plain.	5 Ball..	Ball & r	....	36x4½	36x5
M'l. disc.	Selecti'e.	3	Motor..	Shaft...	140	56½	P. Steel	4 Plain.	5 Ball..	Ball & r	....	36x4½	36x5
M'l. disc.	Selecti'e.	3	Motor..	Shaft. .	140	56½	P. Steel.	4 Plain.	5 Ball..	Ball & r	....	36x4½	36x5

§All magnetos are of the Bosch make.

and it is interesting to note that the Premier Company was the first to use a solid one-piece front axle with the spring seats integral and entirely free from one or more welds.

Semi-elliptic springs are used on the front, each 36 inches long, and three-quarter scroll elliptic are on the rear, with the bottom section 50 inches long and the top 26 inches, thus giving exceptional spring length. The steel used is of the best and is an assurance against breakage, and in addition to being closely held by spring clips the front springs, which are subject to the greatest shock, have drop-forged plates which closely bind the several leaves at the center so that they work in thorough harmony and confine the action to points between the spring pad and the hangers.

A comprehensive line of bodies is provided in both the vestibuled and open types, as five and seven passenger touring cars, four and five passenger Clubmen, two and three passenger roadsters, and five, six and seven passenger limousine cars. With the feeling that the superlative has been reached in mechanical construction the Premier production for the coming year will be marked by most careful attention to the perfection of details. Body lines and general contour have been provided which are thought to be particularly effective and impressive. They will be finished in a rich blue-black with panel lines and light striping. The wheels will be a special Premier gray, except in the case of limousine cars, where the running gear is of the same blue-black finish as the body. Fenders are black baked enamel.

Especially liberal tire equipment is an important feature of all the models, and with 36-inch wheels the "4-40" touring cars, Clubmen and Limousines will have 4 1-2 inch tires all around, and the roadsters will have 4-inch tires all around. The "6-60" cars will have 36 x 4 1-2 inch tires front and 5-inch rear.

The Premier price proposition for 1911 affords a wide range of choice. As compared with last year there is a slight increase in prices, the 1911 6-60 touring car, for instance, being catalogued at $3,650, as against $3,500 for the same model in 1910, and so on. The full list is as follows: Model 4-40—"Touring Clubman," four seats, $3,000; five seats, $3,050, and seven seats, $3,100; Limousine, $4,200; Roadster, $2,800. Model 6-60—"Clubman," $3,500; Roadster, $3,600; Touring, $3,650, and Limousine, $5,000.

Paris' Commercial Census

AUTOMOBILE CLUB OF FRANCE COMPILES STATISTICS SHOWING NUMBER OF MOTOR WAGONS OF VARIOUS KINDS IN FRENCH METROPOLIS

OWING to the fact that no taxation is imposed on purely commercial automobiles, it has been impossible to know exactly how many motors of this type were in use in Paris and the surrounding district. This lack of knowledge has just been remedied by carefully compiled statistics secured by the technical committee of the Automobile Club of France. According to these there are 155 large capacity omnibuses owned by the Paris General Omnibus Co., and 48 omnibuses of small capacity, seating 10 to 20 people, owned by other companies. The General Omnibus Co. is under a contract with the City of Paris to increase its motor buses to 800 within a period of three years; this change is being made gradually.

There are 1,095 trucks and motor delivery vehicles in daily service in Paris or its suburbs. These can be classed as follows:

Useful load 1760 pounds to 2 tons	234
Useful load 2 tons to 5 tons	179
Useful load 5 tons and above	143
Other commercial vehicles	120
Postal vans, carrying 1700 to 2600 pounds	156
Tractors and locomotives	60
Total, including omnibuses	1095

These figures do not include taxicabs, which are now slightly more numerous than horse-drawn cabs, nor the city fire engines, all of which must be converted to power within a period of four years.

Statistics have been obtained of the fuel employed on the 556 vehicles carrying from 1,700 to 5-ton loads. In 416 cases this is either gasoline or benzol. It is impossible to differentiate between these two fuels, owing to the rapidity with which the change is made from one to the other. Kerosene is only used on five trucks; alcohol in one case only. Coke is employed on 131 vehicles and low grade coal gas on three.

The vehicles using kerosene are Darracq-Serpollet steamers, a type of vehicle which is no longer manufactured. The alcohol was a test case. The coke was employed on such steamers as the Purrey, Turgan and Schars, largely used for carrying paper from the mills in the suburbs to the printing offices in the center of the city. The motors using coal gas are built by the Cazes Company.

French Government to License Foreigners

On the recommendation of the Automobile Club of France the French Minister of Public Works has just announced that his government will take the responsibility of issuing driving and car licenses to persons of other nationality than French. Thus, although America offers no reciprocatory benefits, it is possible for an American automobilist, on landing in France, to obtain an international driving and car license which will allow him to enter eleven countries without formality. This, of course, does not affect customs formalities, which are quite distinct from police regulations on drivers and cars.

During the present season a certain number of American tourists have been touring Europe with international passes obtained in England, but this does not appear to have been altogether in accordance with the convention, according to which it was clearly stated that the holders of the pass must belong to one of the countries having signed the agreement. The passes appear to have been given by the English automobile associations under a misunderstanding. The recent decision of France, which will probably be followed by other governments, removes all possibility of misunderstanding. It also creates the unusual situation of allowing Americans, who are obliged to have a separate license for almost every State at home, to run throughout the length and breadth of Europe without changing their tags. A European crossing the Atlantic receives no such benefit in return.

Acme S. G. V. Model

COMPACT MOTOR ALONG FOREIGN LINES; LIGHT AND TRIM LIVE REAR AXLE; EXTREMELY WELL-DESIGNED DETAILS MARK THE 1911 PRODUCT

DISTINCTLY an innovation as compared with its previous efforts, the Acme Motor Car Co., of Reading, Pa., offers the S. G. V. car in two models, the first of which, Model A, with a touring body, sells for $2,500, and Model B, with a runabout body, at the same price. These models weigh about 2,500 pounds complete, and the motor of the 4-cylinder, water-cooled type has an A. L. A. M. rating of 22.5 horsepower. The fine points in this design are not disclosed in a mere statement of the commercial considerations, but an examination of Figs. 1, 2 and 3 will be sufficient to indicate that the designer was actuated by definite motives, resulting in a power plant that is conspicuous for its clean and crisp adherence to well authenticated engineering methods, some of which are shown in the lines, whereas for the rest it is necessary to unearth the design details and observe that the materials employed, and the methods of adaptation, surpass anything that the Acme Co. has heretofore been able to contrive, despite its experience and the excellence of its facilities.

The motor is of the 4-cylinder, water-cooled type, with a bore of 3 3-4 inches and a stroke of 4 3-8 inches. The cylinders are cast *en bloc* with integral inlet pipes, and referring to Fig. 1, C1 is the carbureter, with a straight intake I1, leading to the inlet orifice O1, which is centrally located between the cylinders C3 and C4. The four cylinders C1, C2, C3 and C4, as a unit, have a common flange F1, bolting to a flanged face on the upper half of the crankcase C6, and the spacing between the cylinders C3 and C4 exceeds that of the cylinders C2 and C3, and C4 and C5. The castings are made with an open head, and in the completed motor a water connection W1 near the front end leads to the radiator. From a point in front of the cylinder C5 a water connection W2 leads to the water pump of the centrifugal type, which is incorporated into the upper half of the crankcase C6 and the water pipe W3 serves as the suction for the water as it comes from the radiator, entering this pipe at the point W4. The motor is suspended between chassis members by the arms A1 and A2, which extend out from each side, and the starting crank S1 is supported by an integral extension of the half-time gear cover G1. The flywheel F1 is of the largest safe diameter and a sufficient width of the flange to afford the maximum flywheel effect with a minimum weight.

Referring to Fig. 3, the magneto M1 is of the Bosch type with a fixed point of firing, thus eliminating a spark advance lever on the steering wheel or other relating mechanisms, and among the attending advantages lies the reduction of the wiring to four leads from the magneto to the spark plugs, they being protected by a copper conduit and quick detachable terminals are used on the spark plugs and magneto; moreover the spark plugs S1, S2, S3 and S4, are of the Bosch type with lava insulation. The exhaust manifold E1 is so designed that the holding bolts B1, B2, B3, and B4, are accessible and the manifold sweeps away as it nears the rear of the motor with a long radius curve at a point C1, so that back pressure is reduced to the absolute minimum.

The lubricating oil is contained in the false bottom of the lower half L1, with oil connections O1 and O2. The oil is circulated by a geared pump driven from the rear end of the camshaft, and is forced through properly contrived tubes to the center and end bearings of the crankshaft; the crankshaft being provided with drilled holes for the passage of the lubricant to the connecting rod bearings, whence it is forced to the wrist pin bearings. The cylinder walls are lubricated by the oil thrown up by the rotating parts. All excesses of oil are carried back to the false bottom in the crankcase, being filtered in transit. A convenient filler is provided in the left rear motor leg.

As a further indication of the smoothness and symmetry of design of this motor, reference may be had to Fig. 2. Looking at the front of the motor, the arms A1 and A2 are of substan-

SPECIFICATIONS FOR S. G. V.

MODELS	Price	H.P.A.L.A.M.	BODY		MOTOR				COOLING		IGNITION		Lubrication
			Type	Seats	Cyl.	Bore Inches	Stroke Inches	Cyl. Cast.	Radiator	Pump	Magneto	Battery	
Model "A"	$2500	22.5	Tour'g.	5	4	3 3/4	4 3/8	Block.	Cellular.	Centrif'l.	Bosch...	None....	Pump..
Model "B"	2500	22.5	R'bout.	2	4	3 3/4	4 3/8	Block.	Cellular.	Centrif'l.	Bosch...	None....	Pump..

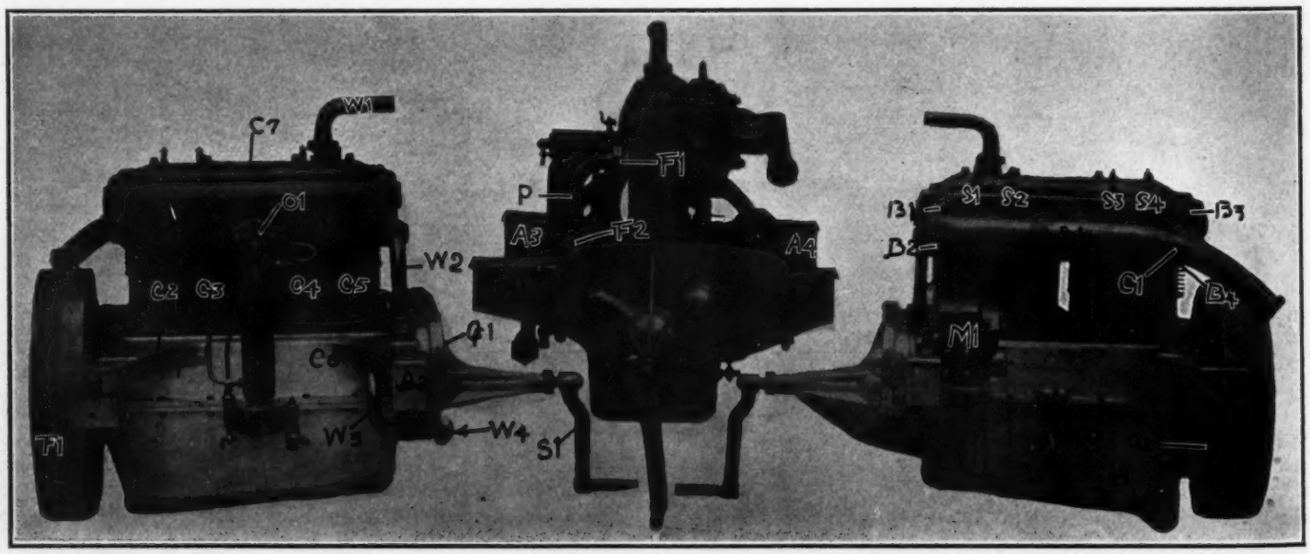


Fig. 1—Carbureter side of the motor Fig. 2—Front elevation in slight perspective Fig. 3—Magneto side of the motor

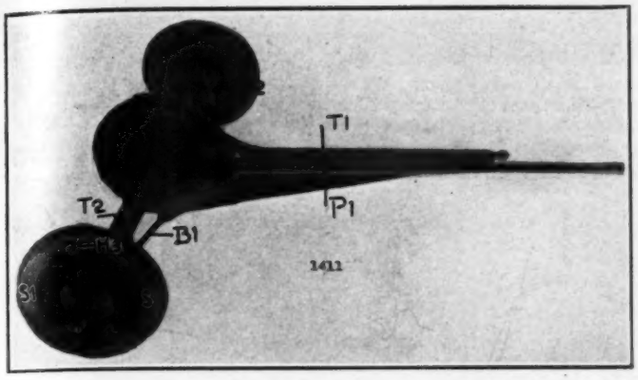


Fig. 5—Live rear axle with bobstays, channel-section torsion tube and rotative perches

tial construction with a considerable depth of web. While the opportunity affords it is pointed out that the arms A3 and A4 are of extra strength, and placed close to the flywheel, so that the gyrations thereof as well as the dead weight are adequately resisted. Coming down to refinements in point of detail, it will be observed that the pipe P1 is provided with accurately machined fittings, F1 and F2, which condition obtains with all the piping around the motor.

In the machining of the motor, in addition to finishing to a definite size and grinding, the domes of the cylinders are machined so that the compression in each cylinder is 76 pounds per square inch absolute, bringing the percentage of compression space to piston displacement of 19.23 per cent., and in fixing upon the proportions of the honeycomb type of radiator as shown in Fig. 4, account is taken of the fact that the flame-swept surface exposed to water circulation is 33.62 square inches per cylinder. In view of the well-defined and accurately governed thermic relations within this motor, the company rating is fixed at 25 horsepower.

With a view to properly governing the kinetic couples, due to speed, the pistons are made relatively light, and ground to a definite size, with a clearance of 0.003 and limits of tolerance of plus or minus 0.00025. The piston rings are cut right and left-handed to prevent lining up. The piston rings are hardened and ground and are secured in piston bosses with two sets of screws which are provided with jam nuts and cotter pins. The connecting rods are made in the I-section, drop-forged, utilizing vanadium steel and are provided with hardened and ground wrist pin bushings. In view of the character of the material employed and the accuracy of finish maintained, the parts composing the reciprocating mass are light in the aggregate, and in this way the kinetic couples, such of them as are unbalanced, are reduced to a point so low that secondary oscillations do not take place within the working limits of speed of the motor.

The crankshaft is cut from a nickel steel billet and is given a successive series of heat treatments. The journals are ground to exact size, barring tolerance limits of plus or minus 0.00025, at a temperature corresponding to the temperature used in the machining of the bearings. The mainshaft bearings are identical with those of the connecting rods; all bearings are supported from the upper half of the crankcase; the lower half acting merely as an oil reservoir. The flywheel is flanged to the crankshaft.

Passing on to the clutch, it is enough to say it is of the multiple-disc type, with 36 steel discs. The leverage is so arranged on the clutch pedal that the pressure necessary to disengage the clutch is 13 pounds. From the clutch to the live rear axle power is transmitted through a propeller shaft as shown in Fig. 5 of the rear axle set, and torsion is taken by the torsion member T1, so that the propeller shaft P1 is free to do its allotted work without having to withstand the pressure of other forces. The axle tube T2 is supported by bobstays B1, and the housing H1 for the bevel drive and differential is of neat design, relatively light, but of great strength. The support for the propeller shaft at the bevel pinion extremity is in the form of a cylindrical housing H2, carrying annular-type ball bearings. The brake shoes S1 and S2 of the internal expanding type are held in the disengaged position by springs S3 and S4, and are expanded by means of a cam C1 with a hinge H3 at a diametrically opposite point.

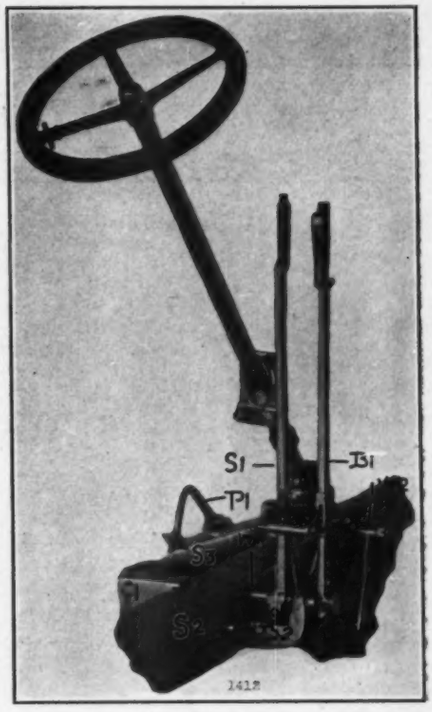


Fig. 6—Detail of the chassis frame at the point of fastening of the side levers

The service brake drum is mounted on the drive shaft to the rear of the transmission casing. The bands are in halves and are controlled by a right-and-left-hand screw actuated by the pedal. The emergency brakes as shown in Fig. 5 are actuated by a side lever B1, Fig. 6, and the speed changes are manipulated through the side lever S1, Fig. 6. The substantial chassis frame S2 is shown, the shaft of the control coming through the web W1 and the extension shaft of the steering gear passing through the web W2.

CARS AS OFFERED FOR 1911

Clutch	TRANSMISSION				Wheelbase	Tread	Frame	BEARINGS			Weight	TIRES	
	Type	Speeds	Location	Drive				Crankshaft	Transmis'n	Axle		Front	Rear
Mul. disc	Selecti'e.	4	Frame.	Shaft...	115¾	56	P. Steel..	Plain...	Ball....	Ball....	2500	34x4	34x4
Mul. disc	Selecti'e.	4	Frame..	Shaft...	115¼	56	P. Steel..	Plain ..	Ball....	Ball....	2500	34x4	34x4

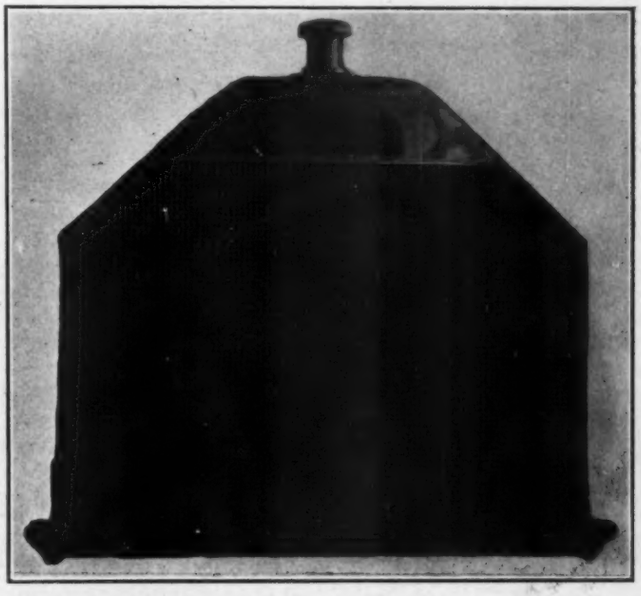


Fig. 4—Presenting the true honeycomb type of radiator with a liberal filler and cap and flexible mounting

The 1911 Roader Car

A CLEAN-BUILT, COMPACT, LOW-PRICED PROPOSITION THAT WILL APPEAL TO THOSE IN SEARCH OF A SERVICEABLE SMALL AUTOMOBILE

SPECIFICATIONS OF THE ROADER CARS

Bore—20-horsepower motor, 3 5-8 inches; 30-horsepower motor, 4 inches.
Stroke—20-horsepower motor, 3 5-8 inches; 30-horsepower motor, 4 1-4 inches.
Wheelbase—104 inches.
Tread—56 inches.
Number of speeds—Two and reverse.
Type of gears—Sliding.
Weight—20 horsepower, 1350 pounds; 30 horsepower, 1500 pounds.
Clutch—Cone, leather.
Cooling—Thermo-syphon.
Lubrication—Splash.
Ignition—Mag. Bosch, H. T.
Springs—Rear, 3-4 elliptic; front, semi-elliptic.
Prices—20-h.p., $650.00; 30-h.p., $750.—F.O.B. factory.

FOR the coming 1911 season a new car of moderate price is being manufactured by the Roader Car Company, of Brockton, Mass. Two models are being placed on the market, the one here illustrated being the 20-horsepower model. The other is built along the same lines except that the motor is larger and gives 30 horsepower. The general lines of the car are very pleasing and with a good rake to the steering post and well-upholstered seats should fulfill the requirements of a comfortable and snappy runabout.

The chassis is of U-section stamped steel to which are attached ample mud guards with side valances to keep out all dust and mud. Both models are fitted with a four-cylinder motor.

The four cylinders are cast *en bloc* and outside the moving parts there are only two castings. The bore of the 20 horsepower is 3 5-8 inches and stroke 3 5-8 inches, and the 30 horsepower has a 4 1-4 inch stroke and the bore is increased to 4 inches. A main feature of the motor is its smooth running, and silence has been attained without loss of power, the flywheel being partly the cause of this, as it is so designed as to allow the car to run on the high gear as low as 4 miles per hour without perceptible jerk. Good hill-climbing qualities are claimed for the car. The combination of flywheel, compression and length of starting crank makes the motor easy to start without unnecessary exertion.

Included in the price of the car is a Bosch high-tension magneto, which is the system of ignition employed on the car, thereby eliminating all battery inconveniences. The splash system of lubrication is used, by which the entire mechanism is kept constantly bathed in oil. The water-cooling is effected by thermo syphon, thus doing away with all pump troubles.

The circulation leads are of ample diameter and the water capacity is extra large. The radiator is a combination of a tubular and cellular type. The gasoline tank is placed at the rear of the bucket seats high enough to give a good head of fuel for the carbureter even on the steepest hill. The gasoline is fed by gravity, and the capacity of the tank is 15 gallons.

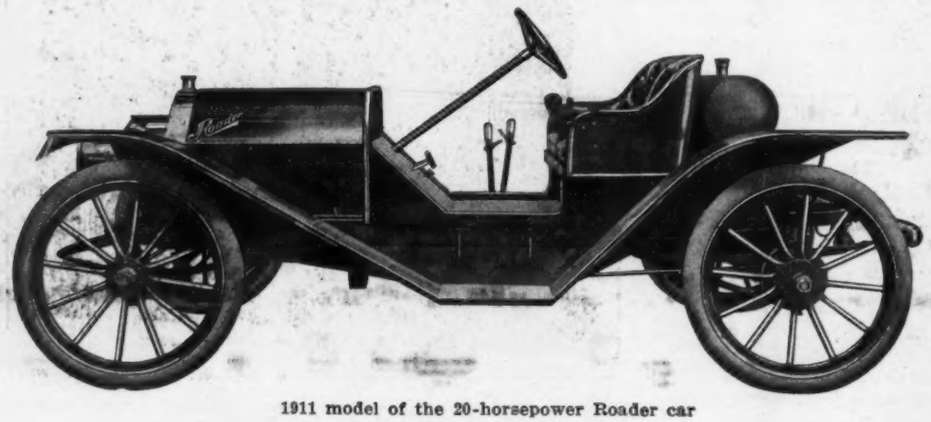
The gears are located in the rear axle casing, doing away with an extra casting for the gear box and following a practice that is being adopted by several makers of high-priced automobiles. It also simplifies the car to a certain extent for the novice, giving him less lubrication to look after, and reduces weight quite perceptibly besides eliminating intermediary shafts and joints. The sliding-gear principle is used and provides two forward speeds and reverse. Shaft drive substantially built is the method of transmission.

The suspension has been well thought out and the rear springs are three-quarter elliptical, 1 3-4 inches wide; the front springs are semi-elliptical, insuring an easy-riding car. Two independent brakes are fitted and both operate on the drums at the rear wheels.

The foot brake is of the external contraction, while the emergency, operated by a lever placed in a convenient position to the driver's hand, is of the internal contraction type. The wheels are 34 inches in diameter and are fitted with 34 x 3-inch tires. The wheelbase is 104 inches and the tread 56 inches. The speed claimed by the makers should satisfy those looking for a fast car; they state that the 20-horsepower model will attain 50 miles per hour and the 30-horsepower a mile a minute.

The standard colors of the Roader car are Roader red or lead gray, and the equipment included in the price consists of two side and tail lights, tools, tire repair outfit and pump. The price of the 20-horsepower model is $650 and of the 30-horsepower, $750, both f.o.b. factory, and when crating is necessary an extra charge of $5 is made.

The firm manufacturing these cars is not new to engine manufacturers, as it has for several years been engaged in the manufacture of motorcycles and engines for same. New machinery of the latest and most up-to-date type has been installed to cope with car building, and although the factory output for 1911 will be limited, no pains are being spared to make everything to standard gauge.



1911 model of the 20-horsepower Roader car

Germany's New Automobile Law

New German regulations for automobile traffic prescribe that only such persons shall have licenses as drivers whose vision is two-thirds perfect without the use of glasses. The new law seems to be enforced in all its strictness mainly against professional drivers, but the physicians entrusted with the examination of the eyesight refuse in many places to make any discrimination in favor of owners, and it is feared that the law, if it remains on the statutes, will eventually affect one-half of the officeholders and other academically educated persons who generally drive their own automobiles without the assistance of chauffeurs. It is suggested that some very beneficial results may in the end be derived from this hardship, since it may lead to renewed investigation of the true causes of myopia in school children, with regard to which much of mystery obtains, and eventually to a material reduction in that mass-murdering or at least crippling of the sense of sight which may be charged against every school system which is otherwise efficient. It is also argued by the advocates of the law that as railroad men have to submit to eye tests, it is but just that those who drive automobiles should similarly qualify themselves.

Engineering Section

DEVOTED TO THE DISCUSSION OF ENGINEERING PHASES OF AUTOMOBILING, INCLUDING DESIGNING AND CONSTRUCTION FEATURES OF PRODUCTS, AND INFORMATION TO AUTOISTS

TURRET-HEADED DRILL PRESS WITH GIG FIXTURE USED IN THE ELMORE PLANT

IN the process that is now going on, having for its basis the standardization of the automobile, there is just a little opposition on the part of the purchasing public, due to the fact that the average autoist has an "ideal" in his mind's eye, and, unfortunately, this ideal bears but little relation to good practice as it is based upon experience. It will be found in the long run that experience counts, and if the maker is not conforming to the ideal of the new autoist it is due to the fact that the siren call of experience tells the maker that the things that look so good to the man who has not tried them are not just what they ought to be.

If men who build automobiles for a living find that certain things do not continue the good promise that the first glance would seem to indicate, purchasers will be wise when they bow to the dictates of experience.

Novel Two-Cycle Motor

LESLIE WALKER'S DESIGN OF AN INTERNAL COMBUSTION ENGINE WHICH IS AN ENTIRELY NEW DEPARTURE IN AUTOMOBILE PRACTICE

SINCE the advent of the valveless motor, automobile engines incorporating new ideas have cropped up on all sides. A novel type of construction, particulars of which appeared in the *Automotor Journal*, does away with the usual type of crankshaft and uses what might be termed a wobble block. The designer, C. Leslie Walker, is taking active steps to complete one of the engines in order to test its anticipated merits.

Referring to Fig. 1, it will be observed that in this "wobble-gear" type of engine construction the cylinders A, which may consist of any desired number arranged parallel with the main shaft and equidistant around it, have their pistons B coupled up by ball-ended connecting rods C to a disc D, which is mounted freely upon the main shaft E, but upon a special portion of it that lies at an angle to the axis of the shaft instead of being coaxial with it. A little consideration will show that as the shaft revolves, the disc D will follow the path that is indicated in the diagram, and that if it is prevented from rotating with the shaft it will cause the pistons B to reciprocate to and fro in their cylinders just as though they were arranged in conjunction with an ordinary crankpin. The all-important point, however, to observe is that the ring D must be suitably anchored, and that everything depends upon the exact motion that it is compelled to take by the anchorage mechanism, as to whether or not smooth running will be secured such as can only result from a steady rate of acceleration and deceleration of the pistons, as they start from rest at one end of their cylinders, and as they come to rest at the other end. In many forms of "wobble-gear" engine hitherto proposed, this lack of correct control on the part of the anchorage device has led to abnormal degrees of vibration as well as to resultant excess of strain on the moving parts, rendering the system impracticable.

Diverting one's attention now to Fig. 2, it should first of all be recognized that there are five cylinders, A arranged in the manner described about the hollow main shaft E, and that the wobble ring D is mounted upon that shaft in just the same manner that is indicated in Fig. 1, except that a double row ball-bearing designed to take the end thrust as well the load is introduced between them. Also it will be seen that the shaft E is carried on large ball-bearings suitably formed to withstand the end thrust that is of course inseparable from engines of this type.

One of the most important things to observe in Fig. 2 is the layshaft D_2, which is mounted parallel with the main shaft E and is carried by the stationary portion of the engine which includes the cylinders and the oil-tight casing E_4 around the shaft E and its specially-shaped flywheel E^2 that gives a true rotational balance to the wobble disc D and its moving masses. This layshaft D_1 is driven through gear wheels D_2 from the

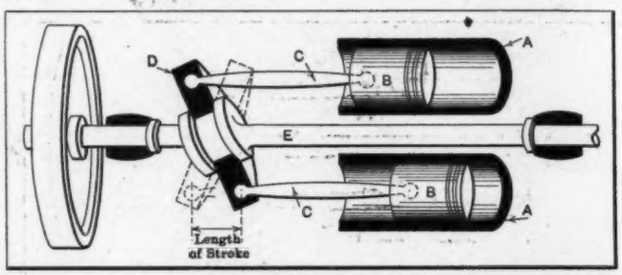


Fig. 1—Diagrammatic sketch indicating the principles of a "wobble-gear" engine

main shaft, and the speed at which it is caused to rotate is double that of the main shaft. Its central portion (between the two bearings D^3) is eccentric with its axis of rotation, and thus it may be regarded as a kind of crankshaft having a very long crankpin on which is free to slide a large ball D^4 mounted axially with the crankpin, and this ball is in turn provided with a spherical socket in the wobble ring D. It is sufficient for the purposes of this article merely to state the upshot of the anchorage device of which we are now speaking upon the connecting rods C and their pistons B. These connecting rods have ball-and-socket joints, as in our diagram, Fig. 1, and it is through them that the power is transmitted from the five pistons B to the main shaft E during the five consecutive and overlapping firing strokes that succeed one another in regular rotation around the shaft. And it is, of course, also these connecting rods that cause the wobble ring D to make the pistons travel back again to the far ends of their cylinders during the ensuing exhaust and intake stroke. That which is important, however, is that during each revolution of the main shaft E the big end of each connecting rod C is caused twice to describe a small circular path, using the spherical small end as a pivot. The actual degree of angularity of the connecting rod is therefore at all times constant, even though the direction of angularity is continually changing, and is, moreover, very small in itself. Movement of this kind is entirely free from jerkiness, and the corresponding travel of the piston B is similiarly admirably suited for smoothness of running—being that which would result with a connecting rod of infinite length on an ordinary crank engine.

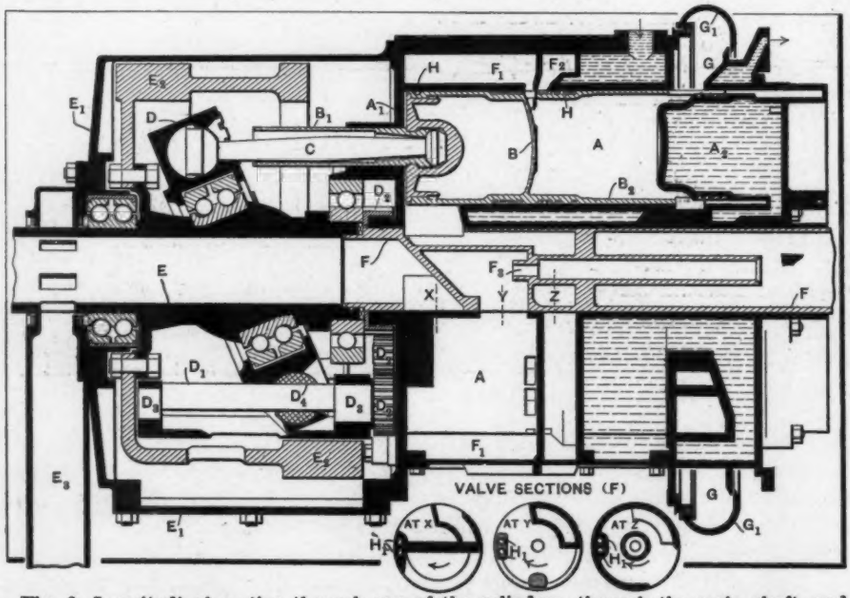


Fig. 2—Longitudinal section through one of the cylinders, through the main shaft, and through the anchorage device, of the Leslie Walker 5-cylinder 2-stroke "wobble-gear" gasoline engine.

Owing to the small angular movement of the connecting rod C it is possible to utilize the front ends of the cylinders A as pumps for feeding the combustion chambers. This is done by fitting each piston B with a tubular piston rod B^1, inside which the connecting rod is free to move, and by fitting a front cover A^1 on each cylinder with a sleeve portion for the piston rod B^1 to slide within. An unusually effective air pump results, since the piston B can be made virtually to sweep out the whole contents of the front end of the cylinder, and to draw in a full charge of air during each succeeding stroke. This construction, however, involves a closed type of piston in which the piston head is no longer cooled by open communication with the atmosphere as in ordinary cases. To overcome this objection, however, it is proposed to imprison within the hollow piston a small quantity of oil, the idea being that this will act as a conveying medium whereby to equalize the temperature of the entire piston, thus enabling its heat to be imparted to the fresh charges of air and to the cylinder walls.

The next matter of importance is to recognize that the long sleeve F, which engages with and rotates with the main shaft E, constitutes a rotating sleeve valve for placing the pump chambers in communication with the hollow shaft E and its stationary

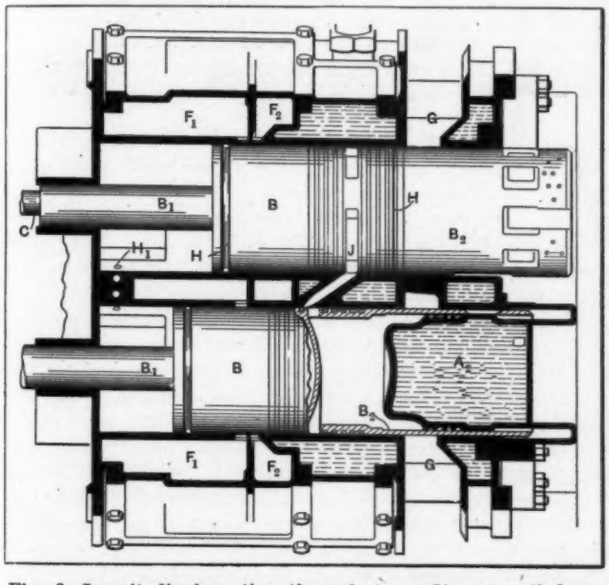


Fig. 3—Longitudinal section through two adjacent cylinders of the Leslie-Walker gasoline engine, indicating the proposed scheme for automatic ignition

feed pipe E^3, for subsequently placing the pumps in communication with the combustion chambers, for introducing the liquid fuel into the air charges and for feeding oil to the reciprocating pistons. In Fig. 2 this sleeve F is purposely shown out of its proper position in relationship to the positions of the other moving parts, but this has been done in order to include a good view of the internal construction of the sleeve—the shape of which is still further made clear by the three transverse valve sections which will be observed at the bottom of the drawing.

A little study of the drawings will show how the valve F places each pump cylinder in open communication with atmosphere through the pipe E^3 during each suction stroke of the piston, and then causes the air to be delivered into the large space F^4, which is formed around the lower ends of all five cylinders A as well as into the separate small passage chambers F^3 that lead to each of the five cylinders. All the pumps are more or less continuously feeding into the large chamber F^4 and this they are intended to do in such a way that the air is carbureted by means of a petrol spray jet situated at F^5, although not shown in the drawing, while, on the other hand, pure air alone is fed consecutively into each of the five smaller chambers F^3 just at the moments when a scavenging air charge is required for exhausting the burnt gases out at the rear ends of the combustion chamber into the common annular exhaust passage G.

Coming now to the control of the combustion chamber, it will be observed that a large water-jacketed cylinder head A^2 is provided for each cylinder, very much as on the "Silent Knight" type of engine, and that the piston B has a long extension sleeve B^2, which fits in beween piston rings on this cylinder head member A^2 and the cylinder wall proper. Ports are cut in the sleeve B^2 close up to the head of the piston proper B and also near the opposite end, the former serving to act in conjunction with similar rows of annular ports leading from the chambers F^3 and F^2 through the cylinder walls, and with other open ports through the cylinder walls into the exhaust chamber G. Hence the actual control of the fresh charge into the combustion chambers, and of the exhaust gases away subsequently, is brought about by the sleeve B^2 alone, its action being, initially, a moment before the completion of the firing stroke to allow pure air to rush in from the chamber F^3, displacing exhaust gases through the port just previously opened to the exhaust, and, secondly, a moment later, to open up communication with the chamber F^4, allowing the fresh charge to be admitted prior to the ensuing compression stroke.

Quite one of the most essential features of the design is the shape of the chambers F^4, F^2 and G in the immediate neighborhood of the peripheral ports leading from them through the walls of the working cylinders. Fig. 4 clearly demonstrates the manner in which the gases are compelled to set up a swirling action in a plane at right angles to the axis of the cylinder itself. The idea, therefore, is to prevent these gases from passing along with any rapidity direct from end to end of the cylinder in a manner that would allow admixture of the fresh combustible charge with the cushioning air charge and with the old mass of exhaust gases, and in this way virtually to form a compact gaseous piston of each of these three sets of gases, so that stratification may eliminate the well-known drawbacks hitherto encountered with engines operating on the two-stroke cycle.

It will of course be observed from Figs. 2 and 3 that the combustion chambers are water-jacketed as well as the cylinder heads, and that two sets of piston rings encircle the pistons in addition to the rings around the head members A^2. Two other details also call for attention, one relating to the means adopted for lubricating the pistons and the other relating to the adjustable ring G^1 for the exhaust gases. Dismissing the latter first, the idea of the inventor is to be able to dispense with any other exhaust box or silencer by so regulating the endless slot G^1 that a constant flow of gas will issue from the five cylinders, while

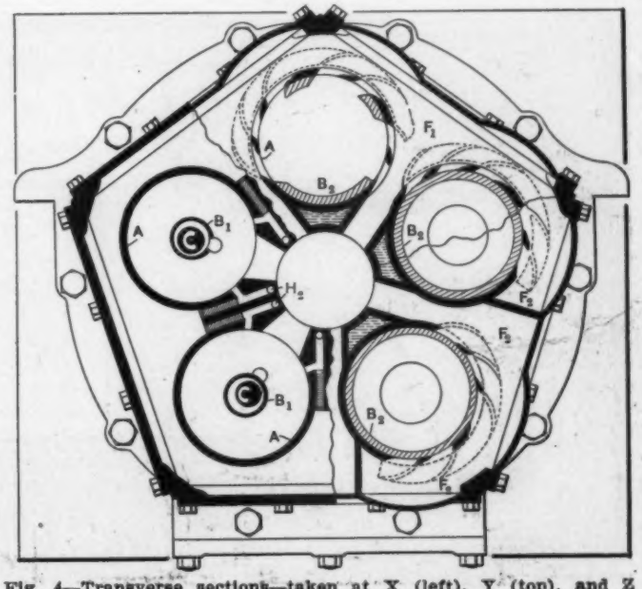


Fig. 4—Transverse sections—taken at X (left), Y (top), and Z (right), respectively—as denoted in Fig. 2

in addition to this a means is provided that may be found useful in controlling the back resistance to the outward flow of the exhaust, thereby varying the compression prior to ignition. As regards lubrication, there are grooves H formed at either end of each piston, these grooves passing around the greater part of the periphery, but not being complete circles. In conjunction with them are feed and return ports H^1 in the valve sleeve F and passageways H^2 in the cylinder castings, the result of these being that oil which is circulated through the ports H^1 in the sleeve F is caused to flow around the grooves at each end of the piston at each dead center from a period representing approximately 20 degrees prior to dead center to 20 degrees after dead center.

Concerning carburetion, we have purposely only cursorily described the means of introducing the fuel to the air charge. Nothing short of experiments can determine whether it is preferable to embody a type of carbureting mechanism into the sleeve F itself, or whether to use an external carbureter of an ordinary type feeding into the supply pipe E^2. In the former case the advantages of the scavenging air charge by way of the chambers F^2 can be retained, and in the latter instance it may, perhaps, prove disadvantageous to have present so large a volume of explosive mixture in case of back fire in the induction. Regarding ignition, since although ordinary plugs would, of course, be provided to begin with, the ignition in each successive cylinder might be effected automatically from a flash obtained from a prior combustion chamber.

A glance at Fig. 3 will reveal the port, J, shown communicating between two adjacent cylinders, the idea there being that the burning gases in the cylinder actually doing its work might be placed in communication with the next cylinder about to fire and thus transfer the ignition continuously around the entire ring. Details of timing, of lag, and so forth necessarily render it impossible usefully to indulge in much surmise in advance on this particular point. A close examination of the views will show several points worthy of notice.

Permanent Wind Shield

THE FEATURE OF THIS MINIATURE TORPEDO BODY DESIGN AS APPLIED TO A MERCER CHASSIS IS TO MINIMIZE WIND RESISTANCE, BY GEO. J. MERCER

THE accompanying illustrations show the picture effect and the working instructions of an entirely new feature in body designing, i. e., the incorporating of the wind shield on the body as a part of the permanent structure. This idea is quite an easy one to apply; it affords good protection during inclement weather in addition to accomplishing the usual functions of a windshield, and, with a transparent portion at the top, it protects the occupants and permits the driver to see ahead. Also, as the illustrations in Figs. 1, 2 and 3 show, the true non-wind resisting effect can be gained by sloping the sides and top of the shield from the engine hood, and this will have, as the illustration shows, the effect of dividing the wind and throwing it off to the side, thereby minimizing effect of wind that actually strikes the glass.

The body is designed for and is shown mounted on a Mercer chassis with 116-inch wheelbase. The front seat on the left side is shown offset back and the door for entrance to the tonneau is on the right side only. A small seat for a mechanician is located on the left side on the runboard. The capacity of the body is for four adults inside and with the additional carrying space in the torpedo stern it makes a snappy car for long touring and the illustration shows the trimming or upholstering plain without tufting. This type of body will look well finished in this manner, and beside the smooth-trimmed body does not hold the dust as the plain surface eliminates the creases.

The important measurements are indicated by figures and the construction is the wood framing and metal panel, the framing is indicated by the dotted lines. As the body is designed the fore-door is left off; should it be desired by a patron, it will be a simple matter to attach a fore-door, and, when the same is being arranged, it will also be proper to consider whether or not it is to be so fitted that it may be removed. While it is admitted that fore-doors are of decided advantage, it remains to be seen whether or not they will prove too warm for Summer use, but it is quite an easy matter to utilize the "Dutch" plan so that the door can be unhinged at will.

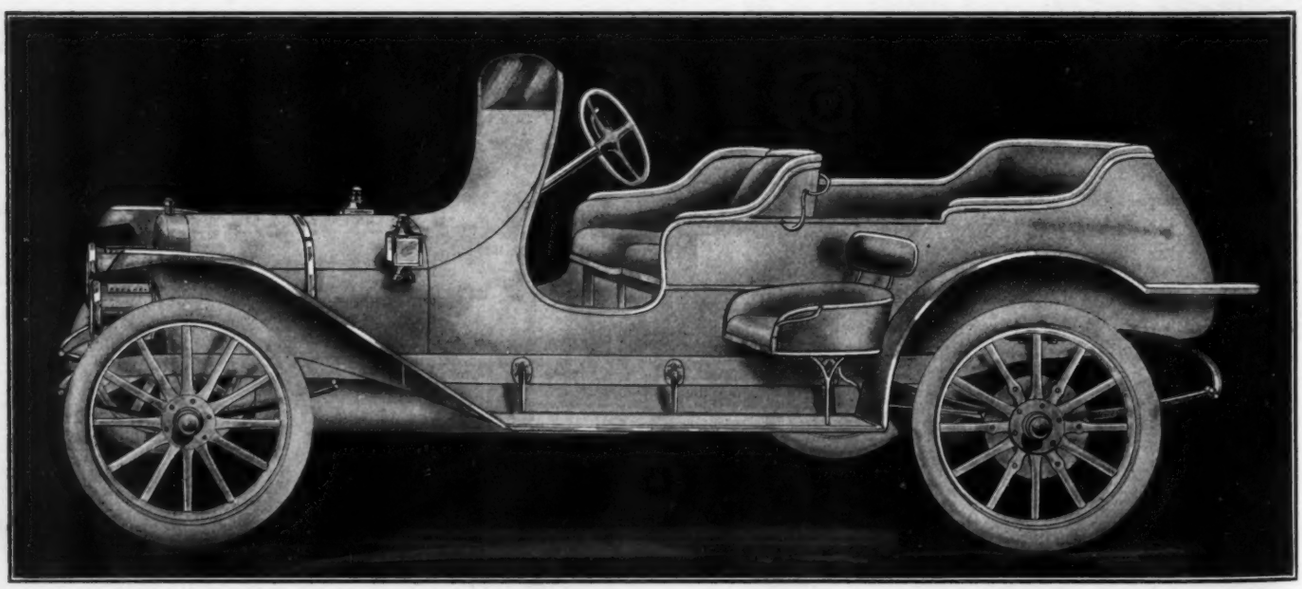


Fig. 1—New type of body with integral windshield and a place for the mechanic

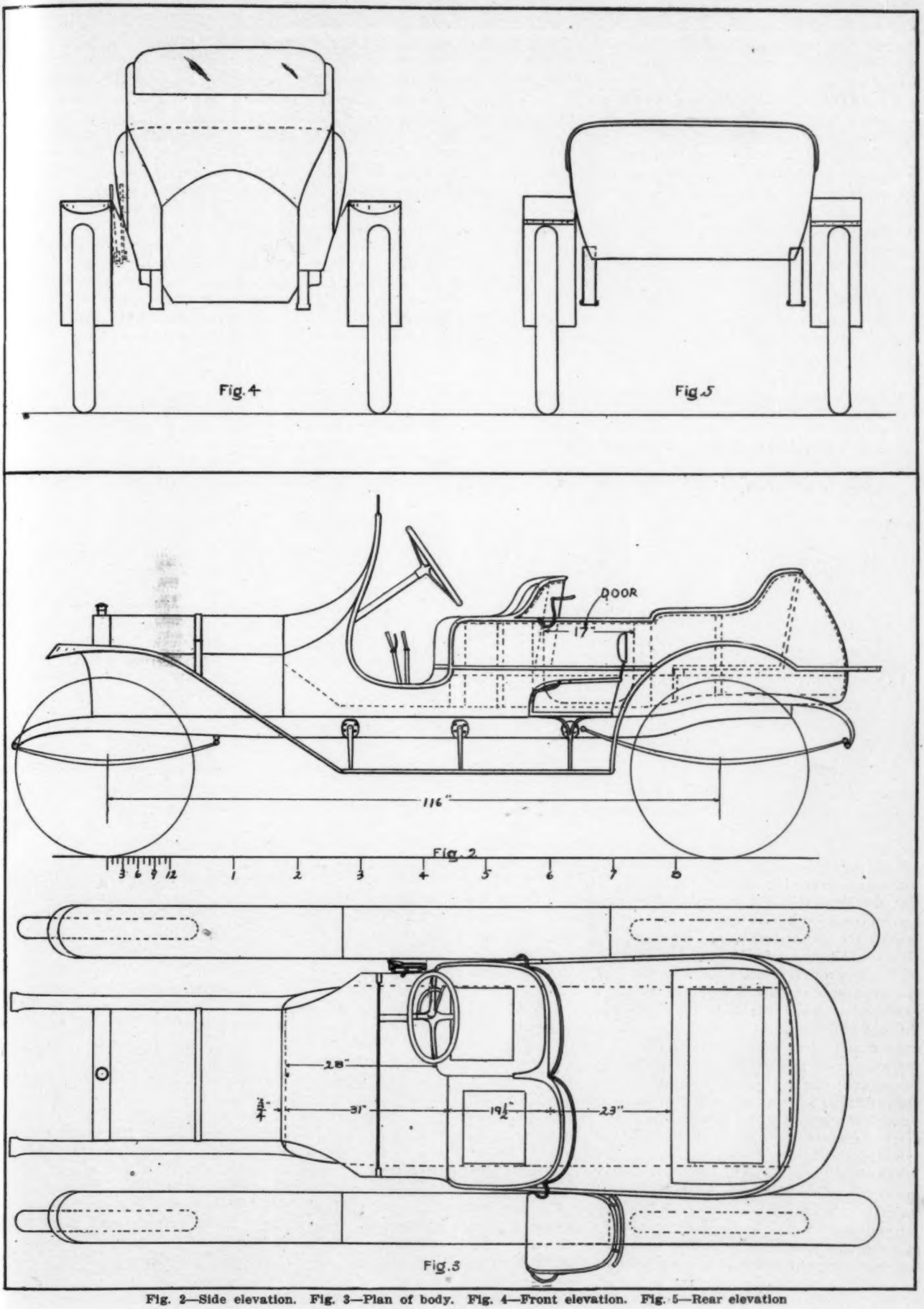


Fig. 2—Side elevation. Fig. 3—Plan of body. Fig. 4—Front elevation. Fig. 5—Rear elevation

Communications

AN ENGLISH RACING EXPERT GIVES HIS VIEWS ON THE VANDERBILT RACE AND COMPARES IT WITH SIMILAR AFFAIRS ABROAD, WHICH HE SAYS ARE MUCH BETTER MANAGED

What a British Racing Driver Saw at the Vanderbilt.—Exactly how much the promoters received from grand stand letting, trade and other entrance fees matters little; but one fact remains and stands clear—the embellishments of the race were conspicuous by their absence. Not a sprig of greenstuff, not a particle of bunting to adorn the weather-stained boards of the grand and press stands. We must not thank the officials who presided over the starting and stopping of the race for its interest; this was provided by the man who paid the piper, and the tune he called was good and gave those who journeyed to Long Island as fine a day's entertainment as they could wish to see.

In a European race meeting the grand stand is covered with bunting and gay festoons. From the tops of the stands fly the flags of all nations, which give a general holiday appearance to the whole gathering. The military is called out to patrol the road and even the color of their uniforms is a relief to the seething masses of people. Automobile races are not conducive to gay colors on the part of the spectators and the early hour of the start necessitates heavy wraps, as comfort is more studied than outside show.

On all sides it is admitted that from a spectacular point of view the race was a great success, the speeds attained phenomenal, the control of the course at dangerous points lamentable, and the condition of the corners bad. A cemented parkway is ideal from a racing point of view as compared with ordinary dirt roads, but level straightaways smooth as a billiard board are less necessary than good surfaces at the corners.

The homogeneity of the surface at the turns was greatly disturbed in the practice on the days preceding the race, but sufficient time remained to remedy this. On the night before the race the corners were quite two inches deep in dust and loose stones, and some idea of how they were on the day of the race can be seen from photographs taken as the racers struck them.

If a man wishes to take his life there is nothing to prevent him throwing himself in front of a locomotive and hurting nobody but himself, but to think that they deliberately cross a course while an automobile race is in progress in a cloud of dust to see the agonies of an injured contestant is beyond all understanding. The words of the acting Mayor of New York will be voiced by everyone interested in the sport of racing. He said, "I believe that the Vanderbilt Cup race should be regulated. Under the present condition it is a menace. These races should be restricted because the danger involved is too great. I do not mean that all automobile races should be stopped, but when the question of inadequate protection arises and when the lives of the contestants are endangered something should be done."

These last few words strike the right keynote. The lives of the foolhardy spectators who venture on the course are of little value compared to those of the participants; the former go on the course at their own risk, and, further, have no right there, consequently cannot claim any sympathy, whereas the competitors are entitled to a free road, and if any accident happens to them through trespassing of the spectators it is impossible to say what further damage may be done through the machine running amuck at about 60 or 70 miles per hour.

The old adage of "*Va Victis*" is as applicable to-day as it was in the days of the gladiators, but at any rate the vanquished then had equal chance with the victors and fair play. The race just run ended in a victory by the close margin of a few seconds and as the second man actually hit two spectators who were on the course it cannot be estimated how much Dawson on the Marmon was retarded, but anyone can imagine the shock to any human being's *sang-froid* after mowing down his fellow-creatures.

Tales are told of soldiers who before a battle are as nervous as children, but the moment the first shot has been fired are transformed into fiends incarnate, willing to brave anything and to court death at any moment. The same cannot be said of a motor racer; as long as he has a clear road his nerve stays with him, but as soon as the course is encroached upon by the public the fear of hurting somebody robs him of his nerve. The nerve of an automobile racer is the most precious thing he has; we have heard of men driving to victory after an eye, a leg, or an arm has been put out of use, but never after a man has lost his nerve. A case happened in Italy in one of the big road races there. A young amateur started full of hope of victory and ran well for three circuits of forty miles; but at the end of the fourth circuit after seeing the débris of four wrecks strewn along the course he lost all his nerve and wanted to stop, and give up. His friends persuaded him to continue, which at last he did. Three miles further he struck a large mile stone and was instantly killed, although the road was perfectly straight at the spot.

The less said about the press accommodations the better; the announcer's enunciation was clear, but the information was meager.

At the pits, for the most part, bungling and confusion were responsible for the loss of valuable time to such an extent that expeditious work is worthy of special note. The Benz team had a system of tire changing that others might copy with advantage. An eight-foot lever jack was placed under the axle of the car the moment it came to rest by one man while another undid the locking arrangement of the demountable rims with a brace. By this time a new tire was handed to him to replace the old one taken off, by simply lifting it; a few turns of the brace to tighten it up, take the jack away, and off again. Mulford, on the Lozier, changed a valve very quickly in full view of the grand stand, and it was fascinating to watch his composure adjusting the points of a new spark plug. The lightning change of tire on the Alco at the commencement of the 21st lap was a *chef d'œuvre* and the slightest mistake at this point would without doubt have cost him the race.

The foreign method of adjustments seems better than that employed during this race. The pits are manned by assistants to hand out to the driver and his mechanic what they require, but are not allowed on the course at all, everything having to be done by the contestants themselves, in which case each man has an equal chance with the others, the rapidity of work depending, as it should, upon the skill of the men and not on the length of the pocket of the entrants.

It is almost unnecessary to allude to the corners, where the sensation-mongers flocked. Of course, it is only natural that where there is greatest excitement there is bound to be the largest attendance; this being so, the patrolling at these points should be adequate to prevent the crowd from overflowing the course. A suggestion might be offered after last week's experiences. Besides the boards that were put at the turns (these should be much longer), wire screens about 15 feet high should be erected; they would protect the spectators from the showers of stones and be an additional prevention in keeping people off the course. No one should be allowed within 20 feet of the danger zone and the police empowered to arrest anyone crossing the course, treble the police at the danger spots and remove all wreckage as soon as an accident happens, pad the wooden structures erected at the turns with hay so that if anyone is thrown against them there will be a chance of them striking something soft to deaden the impact.—M. J. H., London, England.

An Ideal Automobile

THAT THE AVERAGE AUTOIST IS HARD TO PLEASE IS FEARED; PERHAPS THE IDEAL AUTOMOBILE AS HERE SUGGESTED WILL ACCOMPLISH THE IMPOSSIBLE

MATHEMATICIANS would say that the ideal automobile would have in its make-up the square root of mean square of all the good points that are to be found in all the automobiles that were ever made; each autoist would argue for a car that would meet with his approval, and in trying to settle upon just what he would approve of he would be sure to exclude everything that ever gave him any trouble at all, especially if there was a cost question to be considered.

As an ideal proposition, however, it takes a "wag" to firmly grasp the situation, and the following is one wag's version of the qualities that an ideal car should hold in the hollow of its horny hand.

A Wag's Version of an Ideal Automobile

It would:

(a) Cost nothing to run.
(b) Settle for the tire bill.
(c) Execute the road hog.
(d) Snub the joy rider.
(e) Never go astray.
(f) Improve the roads.
(g) Lay the dust.
(h) Chastise the chauffeur.
(i) Manufacture gasoline.
(j) Improve lubricating oil with age.
(k) Persuade the farmer to love the automobile.
(l) Subdue the politician who thinks he can frame wise automobile laws.
(m) Keep water out of the gasoline.
(n) Side step punctures.
(o) Be gearless.
(p) Pipe the latest air instead of making a noise.
(q) Put a conscience in the anatomy of the repair man.
(r) Clean itself.
(s) Dodge the neighbor who wants to fill the spare seat in the tonneau.
(t) Keep up to the latest style without having to dress up in a new body each year.
(u) Clear the roadway ahead, eliminating the need of a horn.
(v) Light the way o'nights.
(w) Keep it's own brass work shining.
(x) Get along in cold weather without freezing up.
(y) Go like the wind.
(z) Stop in its own length.

Dont's

INJUNCTIONS COVERING A VARIETY OF SUBJECTS BEARING UPON THE AUTOMOBILE FROM THE SEVERAL POINTS OF VIEW AND SAGE ADVICE TO THE MAN WHO WOULD ENTER WHERE ANGELS FEAR TO TREAD

Don't purchase a motor so small that a muffler cutout will have to be used in order to make the power patch out—what you really need is a motor that will deliver the required amount of power cutout or no cutout.

Don't go rushing across space with a screeching muffler cutout as much as to say, "Here I come (a beggar a car-back) out of an obscure past, ready to show the stripes on a new suit of clothing and make myself conspicuous."

Don't try to determine the ratio of alcohol to gasoline—that makes the automobile lead up to the front of a hospital; it is a variable quantity in any case—a very little alcohol does the trick in some instances, especially if it is placed in a certain tank.

Don't argue with the chauffeur about what he is to do—get one that will know without having to be persuaded.

Don't try to acquire all the cardinal virtues in a chauffeur; he will shine too brilliantly in your presence if you get him.

Don't be satisfied with a man who says he is thoroughly capable, especially if he is good at making excuses.

Don't take excuses—demand that the automobile be in serviceable condition, or learn the reason why.

Don't expect the automobile to be in serviceable condition if it is old and is in need of an overhauling; it is cheaper in the long run to give it the periodical overhauling that will offset depreciation.

Don't forget that it is in just as bad taste to toot the horn of your automobile continuously as it is to toot your own horn—let up.

Don't sign contracts to leave your car for an indefinite period with a second-hand dealer.

Don't believe a man can easily sell a second-hand auto.

Don't agree to pay for all sorts of extras for car selling. Agree upon either a fixed sum net for the car or place your reserve on it and allow a commission.

Don't expect to obtain the same price for the car after it has run as it cost new. If you intend to sell the car immediately after you have bought it don't run it.

Don't expect people to think that after a car has only run 1,000 miles it is always a journey abroad that causes you to sell it; they may blame the car.

Don't buy a second-hand car by the outside looks; get someone who knows to look inside.

Don't run away in case you have an accident. If you are to blame you will be treated worse if you run away than if you stop; if you are not to blame you will be if you decamp.

Don't use force on nuts; patience, persuasion and kerosene are infinitely better.

Don't drive past a sign post if you don't know the way. Stop. It is quicker than to go on and wonder if you are right and come back 20 or 30 yards on the reverse, especially at night.

Don't spirit your good intentions away while you hesitate long enough in front of a road house to beat your will into abject submission—drive right along.

Don't pose on the pinnacle of success; some one will come along and pull the pinnacle out from under you.

Don't strap yourself to the idea that the last good task that you may have performed is the record—the real record is as yet nestled on the bosom of future possibilities.

Questions That Arise

CONCERNING THE THEORY OF WIND RESISTANCE; LOCATING LOSS OF PRESSURE IN PRESSURE-FED CARS; FORMULAE FOR SUSPENSION SPRING DESIGN; CAUSES OF HOT MOTORS, ETC.

[246]—What is the force per square foot pounds as compared with the velocity of wind?

A formula often accepted is $P = 0.005V^2$, in which V is the velocity in miles per hour. It was put forward for surfaces in use in windmill practice. Smeaton's table is as follows:

Velocity and Force of Wind, in Pounds per Square Inch

Miles per hour.	Feet per second.	Force per sq. ft. pounds.	Common Appellation of the Force of Wind.	Miles per hour.	Feet per second.	Force per sq. ft. pounds	Common Appellation of the Force of Wind.
1	1.47	0.005	Hardly perceptible.	18	26.4	1.55	
				20	29.34	1.968	Very brisk.
2	2.93	0.020	Just perceptible.	25	36.67	3.075	
3	4.4	0.044		30	44.01	4.429	High wind.
4	5.87	0.079		35	51.34	6.027	
5	7.33	0.123	Gentle pleasant wind.	40	58.68	7.873	
6	8.8	0.177		45	66.01	9.963	Very high storm.
7	10.25	0.241		50	73.35	12.30	
8	11.75	0.315		55	80.7	14.9	
9	13.2	0.400		60	88.02	17.71	
10	14.67	0.492		66	95.4	20.85	Great storm.
12	17.6	0.708	Pleasant brisk gale.	70	102.5	24.1	
14	20.5	0.964		75	110.	27.7	
15	22.00	1.107		80	117.36	31.49	Hurricane.
16	23.45	1.25		100	146.67	49.2	Immense hurricane.

Other formulæ put forward are:

Professor Martin, $P = 0.004V^2$

Whipple and Dines, $P = 0.0029V^2$

At 60 miles per hour these formulæ give a pressure per square foot of 18, 14.4 and 10.44 pounds, respectively.

[247]—How to locate loss of pressure in pressure-fed cars.

The most vital part of a pressure system is the relief valve, and it is more often due to trouble here that the pressure will not hold. Nothing is more annoying than to continually have to pump up pressure by hand owing to a leak. If exhaust gases are used a strainer or filter should be placed between the exhaust outlet and the valve, otherwise all impurities such as carbon and burnt oil will clog it or find their way under the seats of either of the mushrooms. The component parts of this valve are two small checks in the nature of a back pressure and safety valve combined with springs to hold them in tension on their seats and regulating screws. The amount of pressure passing into the tank can be regulated from below and the point at which the pressure is released is altered by turning a screw above.

A pressure of from two to four pounds is necessary to give the required head of gasoline in cars where the tank is placed at the rear. The filler cap being loose or the washer defective will cause a leak; the best material for such washers is leather, and a spanner should be used to tighten the cap. If the oil is under pressure and in the same circuit as the gasoline a leak at the oil tank cap will prevent the gasoline from reaching the carbureter, and the same effect will be produced if the oil runs out; then the pressure will go into the tank and escape through the lubricator. In the types of relief valves where a steel ball is used this should be taken out often and cleaned, otherwise it will become pitted and the smallest quantity of this is sufficient to cause a leakage.

It should not always be imagined because gasoline does not flow at the carbureter that the pressure is at fault; the first thing to look at is the level of the gasoline in the tank. This may sound too trivial to mention, but many an autoist has gone over his car from one end to the other only to find that a few gallons of gasoline would have remedied his troubles.

The pipe in some pressure tanks is fed from the bottom to the top, and while climbing a hill with little gas in the tank it flows toward the rear and uncovers the pipe, leaving it nothing to feed from and allowing all the pressure to escape.

[248]—What are the formulæ for the correct design of suspension springs?

The method often followed is one of trial and error. For single springs the following by D. K. Clarke is often used:

$$\text{Safe load in tons} = \frac{BT^2N}{CS}$$

in which

B = width of plates.

T = thickness of plates in 1-16 inch.

N = number of plates in spring.

S = span of spring in inches.

C = constant = 11.3.

To determine the deflection in inches per ton-load the following formula is sometimes used:

$$D = \frac{L^3}{CBT^2N}$$

where

D = deflection in inches per ton of load.

L = span of spring in inches.

C = constant = 40,000 for single springs.

= 20,000 for double springs.

T = thickness of plates in inches.

N = number of plates in the spring.

When the springs are first put to work they will probably take a certain set and this must be allowed for.

[249]—What are the causes of overheating of a gasoline motor?

Insufficient supply of water.

Failure of the water pump, caused through breakage of the spindle, shearing of the key holding vanes to axle.

Air lock in the water system.

Slipping clutch.

Excessive lubrication or bad quality oil.

Wrong timing of the exhaust valves or too little lift of same.

Car being too low geared for speed of the engine.

Close proximity of the water circulating pipes to the exhaust manifold.

Presence of grease or other foreign matter in the circulating system.

Too much gasoline in the mixture.

Running with the ignition retarded.

Fan belt slipping.

Pump running too fast, causing the water to accumulate at the top of the radiator and pass away out of the overflow before it has time to pass through the radiator.

[250]—What is the solution and force of current used for nickel plating?

The solution mostly used is made from the double sulphate of nickel and ammonia, with the addition of a little boracic acid under certain conditions.

The double salt is dissolved by boiling, using 12 to 14 ounces fo the salts to a gallon of water. The bath is then diluted with water until a hydrometer shows a density of 6.5 degrees to 7 degrees Baumé. Cast anodes are to be preferred, as they give up the metal to the solution more freely. Anodes should be long enough to reach to the bottom of the work and should have a surface greater than that of the objects being plated.

The current should be moderate. Voltage may vary from 3.5 to 6 volts and from 0.4 to 0.8 ampere per 15 square inches of surface of the object. Zinc requires about double this current. A nickel bath should be slightly acid; an excess of alkali darkens the work and an excess of acid causes peeling.

Letters

COMMUNICATIONS FROM READERS MAINLY ALONG TECHNICAL LINES; CORRECT SHAPE OF PISTON RINGS; TO STOP OIL LEAKS FROM BASE CHAMBERS; HOW TO INSTALL A CONSTANT-LEVEL LUBRICATOR; NEW TWO-CYCLE MOTOR; MAKING A HEADLIGHT BRACKET

Cap Shape of Piston Rings

Editor THE AUTOMOBILE:

[2,389]—Having been informed on many valuable points in automobile design by your paper, I am taking the liberty of asking you a question.

If a piston ring is turned and cut to make a true arch with its outside circumference before being compressed to fit into the cylinder, does it form a true circle when compressed in the cylinder, unless the side where the ends of the ring meet have been made thinner? To be more explicit should the piston ring not appear when in perfect finish as in B (Fig. 1)?

Ardmore, Pa. E. RADIFER STANCLIFF.

It is common practice to make piston rings as you suggest, as when the ring is made a true circle within its inside diameter there is a likelihood of its expanding in a more or less oval form and there are the chances of the cylinder being worn oval before the rings have worn to a circular shape. The outside circumference should be a perfect circle with the slit closed. Another method employed is to take a concentric ring as in A, and place it round the extension of a vise in the manner shown in the diagram. A pien hammer is used (C) and blows are struck on the ring at a true tangent point and not, for instance, at b; otherwise the result will be a broken ring. This method of tapping at every 3-8 of an inch causes a small indentation as shown and gives them a perfectly uniform spring. The blows should be harder opposite the slit and soft near the slit.

To Stop Oil Leaking

Editor THE AUTOMOBILE:

[2,390]—I have constant trouble to keep the oil from running out of the joint between the two halves of the base chamber of my engine. Can you suggest anything to remedy this trouble?

Portland, Me. P. F.

You can either cut a piece of brown paper to the shape of the face, cover it with a thin coat of white lead, turn the bolt up tight, and it should hold; but every time you break the joint you will have to make a fresh one.

Another method is to cut a small groove around about 1-8 inch deep and insert some string asbestos in it, as in Fig. 2. With the pressure this will tighten up and act as a washer; at any time you have to take the motor apart all that is required is a new piece of asbestos string.

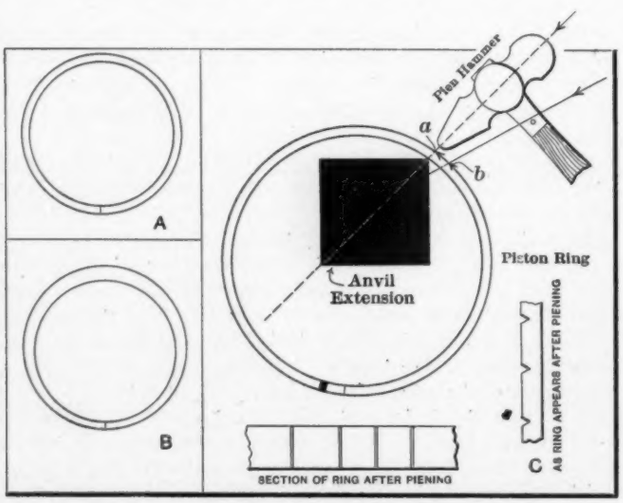


Fig. 1—Method of piening piston rings

Installing a Constant Level Lubricator

Editor THE AUTOMOBILE:

[2,391]—I want to install on my Mitchell 1910 car a lubricator for purpose of maintaining a constant level in crankcase. Only available place to hang the tank is about 17 inches above level of oil in crankcase. Tanks to be about 4 in. x 12 in. hung horizontally. What size pipe shall I use to carry oil to crankcase and must it be choked? If so, where? How far below the desired level should outlet end of pipe be placed? Will appreciate any advice you can give me.

Mineral City, O. J. IRA DAVY.

An easy method of maintaining a constant level in the crankcase of your engine can be readily seen by referring to Fig. 4. In the existing plug holes 3-8 inch standpipes are fitted to the correct oil level as shown, and from these 3-8 inch copper pipes carry the oil to an ordinary gear pump. This should be attached to the base chamber, if possible below the level of the oil, and a shaft run from it to which is attached a pulley wheel in line with the existing lubricator wheel. The belt can then be utilized to run both without doing away with the existing oiling system to the bearings.

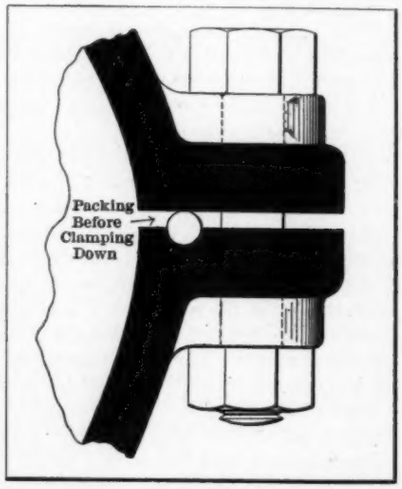


Fig. 2—Making an oiltight joint for two base chamber halves

The oil is then led from the pump as the sketch shows to a sight lubricator on the dash and passed through a sight feed to a reservoir situated on the dash or some other convenient place above the crankcase, from where the oil is returned to the crankcase by two pipes in its upper part. A tap should be fitted under the reservoir to cut off the supply if necessary during running and when the engine is stopped.

Running Electric Light Off Magneto

Editor THE AUTOMOBILE:

[2,392]—I am a reader of your magazine, THE AUTOMOBILE, and would like to ask for some information in regard to electric lights. I have a Haynes car with low-tension magneto which runs through a condenser and would it affect the running of the car on the magneto, and if not would it be best to connect before or after the current goes through the condenser, and please describe as near as possible the size lights, etc., for such an arrangement. Find enclosed self-addressed letter for return.

Thanking you in advance, I am,

Gonzales, Tex. C. A. HOSKINS.

You cannot use the magneto on your car for electrically illuminating it. You must either use a storage battery or small dynamo.

Left or Right Hand Running Motor

Editor THE AUTOMOBILE:

[2,393]—I have pleasure in handing you a sketch (Fig. 5) showing a method of altering the timing of a four-cycle engine to allow it to run in either direction.

A is a gear free upon the crankshaft and B is a sprocket wheel also free upon the crankshaft. *C* is a jaw clutch, yet it can be slid back and forth up the crankshaft upon a four cut keyway. The gear *A* and the sprocket *B* are set in such a way that when the engine is on dead center the jaws *I* and *K* are at the upper side of the shaft and exactly opposite. Let clutch *C* be engaged with gear *A* and the valves are timed; run engine clockwise, looking from the front. The sprocket *B* runs in the opposite direction, but always passes at the bottom and top of the shaft.

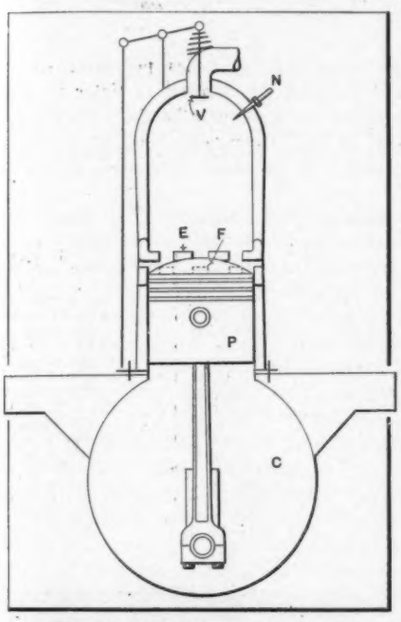


Fig. 3—A new two-cycle motor

Now, if you stop the engine and disengage the jaw clutch *C* from gear *A* and at the same time apply a brake to the camshaft, turn the engine over in the opposite direction until clutch *C* matches jaw *K* and engage them, you will be able to run the engine in the opposite direction counterclockwise.

Keep in mind that while you are turning the engine over to engage *C* with *K* the camshaft has been kept in the same position as it was when engine was stopped.

Although now the crankshaft is running in the opposite way the camshaft is not, and therefore the valves are opened in the same rotation.

New York. SUBSCRIBER.

A New Two-Cycle Motor

Editor THE AUTOMOBILE:

[2,394]—I should be glad to have the opinions of your readers upon an idea I herewith send you upon something new in the two-cycle line (see Fig. 3).

Referring to sketch: V represents exhaust valve; N, fuel injector nozzle; E, a series of exhaust ports; F, a series of inlet ports. The action of the motor is as follows:

Piston P on the downward stroke uncovers exhaust ports E, allowing the hottest gases to escape through them. At this point the exhaust valve V opens simultaneously with the inlet ports F, thus allowing the charge of cold air that has been previously drawn in crank case to fill the space above the piston and to force out the charge that has been burned. Exhaust valve V remains open until the piston has returned to a position on its upper stroke, where it has displaced the contents of the combustion chamber, thus affording perfect scavenging of the burned gases. No fuel enters the cylinder until all ports are closed and the cylinder has entrapped a charge of fresh air.

Cleveland. A. E. P.

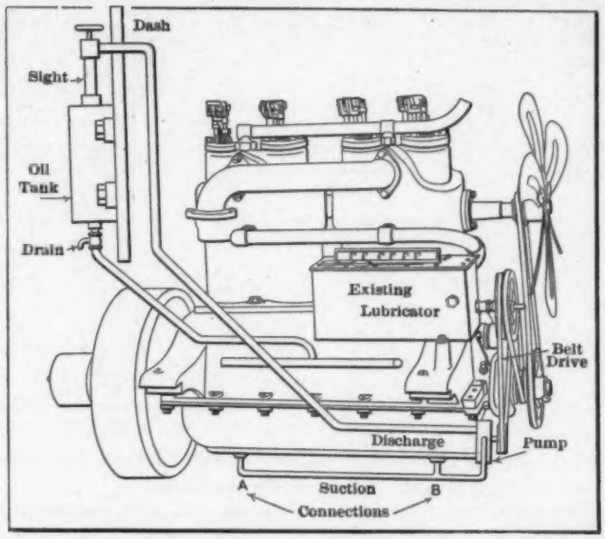


Fig. 4—Supplementary oiling arrangements to maintain constant level of lubricant in base chamber

Too Much Gasoline in Float Chamber

Editor THE AUTOMOBILE:

[2,395]—As a reader of your publication will you advise me through your columns what caused the following difficulty with my carbureter?

Car running smoothly, but obliged to stop engine half-way up a steep hill on account of slipping clutch, and on trying to proceed after ten minutes' halt, the engine declined to respond to cranking of the motor.

Wiring and ignition were found in order, but I noticed gasoline was dripping from carbureter, probably due to flooding, possibly caused by the car standing on the steep grade. Opened petcock beneath the carbureter and after closing same, allowed engine to remain idle for a few minutes, whereupon cranking the motor vigorously, she started off all right.

Was this due to the car standing on a steep grade? If so, why should carbureter flood? Same is gravity fed and was well filled with gasoline at the time, as observed through the glass bowl of the Stromberg.

JAMES W. WORTH.

New York.

The cause may be that the adjustment of the level is incorrect, allowing too much gasoline into the float chamber; not sufficient, however, to cause an overflow when the car is standing still, but

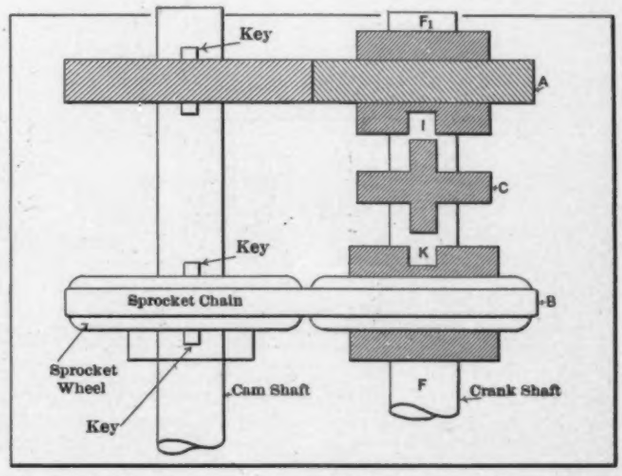


Fig. 5—Arrangement for altering timing of a four-cycle motor to permit it to run either way

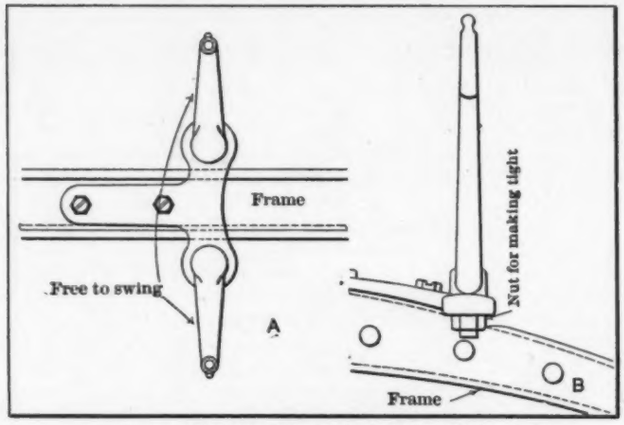


Fig. 6—Headlight bracket to fit any lamp

as soon as it is inclined and allowed to stand still on an upward grade it overflows the jet, causing the flooding.

The layback of the needle valve while the car is standing still on an up-grade will cause an overflow at the jet if the seat of the needle is not a perfect fit on its seat or any small impurity finds its way underneath same, rolling back owing to the inclined plane of the car.

The effect of flooding will not be noticed as long as the car keeps going, as the extra amount of gasoline will be used up by the extra work called upon the motor to perform; in fact, it will improve the running of some cars to place the float chamber in front of the jet.

Headlight Brackets to Fit All Lamps

Editor THE AUTOMOBILE:

[2,396]—What method would you suggest for making lamp brackets to fit several types of cars and different lamps?

South Amboy, N. J. INQUIRER.

The accompanying sketch (Fig. 6) shows a method of making headlight brackets to answer your requirements. It is made in three parts, the T-piece to be bolted to the extension of the dumb-iron of the frame in front of the radiator. The side arms that hold the lamp fit into the two holes and are held securely by a split washer and nut; by undoing the nuts the arms can be adjusted to fit any lamps of ordinary size. If extra large lamps are used, new arms can easily be made.

Notable Speed in Voiturette Race

Editor THE AUTOMOBILE:

[2,397]—In the recent Voiturette race in which the times were so phenomenal it is very surprising that such small engines could develop such speed. Kindly inform me of sizes of respective engines?

Madison, Wis. A. T.

The winner's average speed was 56 miles per hour over a circuit of 23.7 miles, which had to be covered 12 times to make up the 284 miles. The fastest lap was made by the Lion Peugeot driven by Goux in 24 min. 33 sec. Zuccarelli's time for the entire circuit was 5 hours, 4 minues, 50 seconds. The sizes of the engines are as follows:

Car	No. Cyl.	Bore	Stroke
Tribel	4	65 mm. (2 9-16 in.)	180 mm. (7 3-32 in.)
Hispano-Suiza	4	65 mm. (2 9-16 in.)	200 mm. (7 7-8 in.)
De Bezelaire	4	69 mm. (2 23-32 in.)	110 mm. (4 11-32 in.)
D.S.P.L.	4	65 mm. (2 9-16 in.)	140 mm. (5 33-64 in.)
Lion Peugeot	4	65 mm. (2 9-16 in.)	260 mm. (10 1-4 in.)
Lion Peugeot	2	80 mm. (3 5-32 in.)	280 mm. (11 1-32 in.)
Calthorpe	4	65 mm. (2 9-16 in.)	170 mm. (6 45-64 in.)
Calthorpe	4	65 mm. (2 9-16 in.)	150 mm. (5 29-32 in.)
Corre Licorne	1	100 mm. (3 15-16 in.)	300 mm. (11 13-16 in.)
Corre Licorne	1	100 mm. (3 15-16 in.)	250 mm. (9 27-32 in.)

1911 Models Knight Daimler

NOVELTIES IN DESIGN INCLUDE ADOPTION OF WORM GEAR DRIVE, INCLINED MOTOR AND SPECIAL LUBRICATION SYSTEM

IN the particulars of new models of the English Knight Daimler that have appeared recently there are several new features worthy of note, particularly in the 12 horsepower model. The cylinders are cast en bloc with a bore of 69 mm. (2 23-32 in.) and stroke 114 mm. (4 1-2 in.). The engine is set in the frame at a considerable angle, sloping rearward, thus saving the uni-

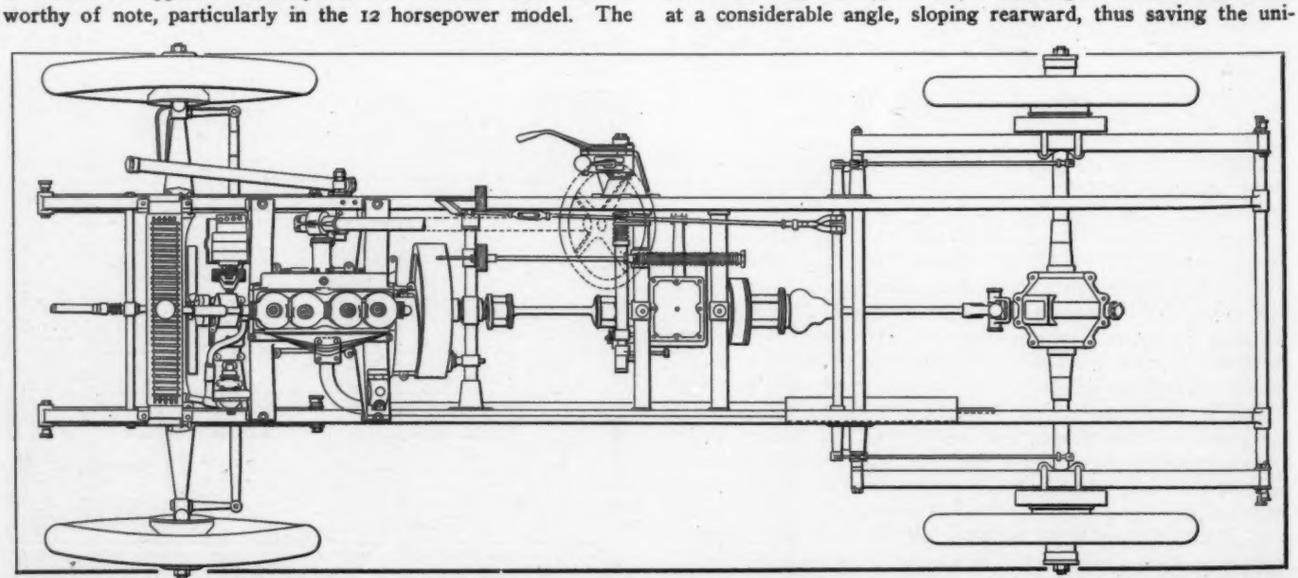


Fig. 1—Plan view of Knight Daimler chassis, showing external clutch spring and double universal jointed shaft between gear box and engine

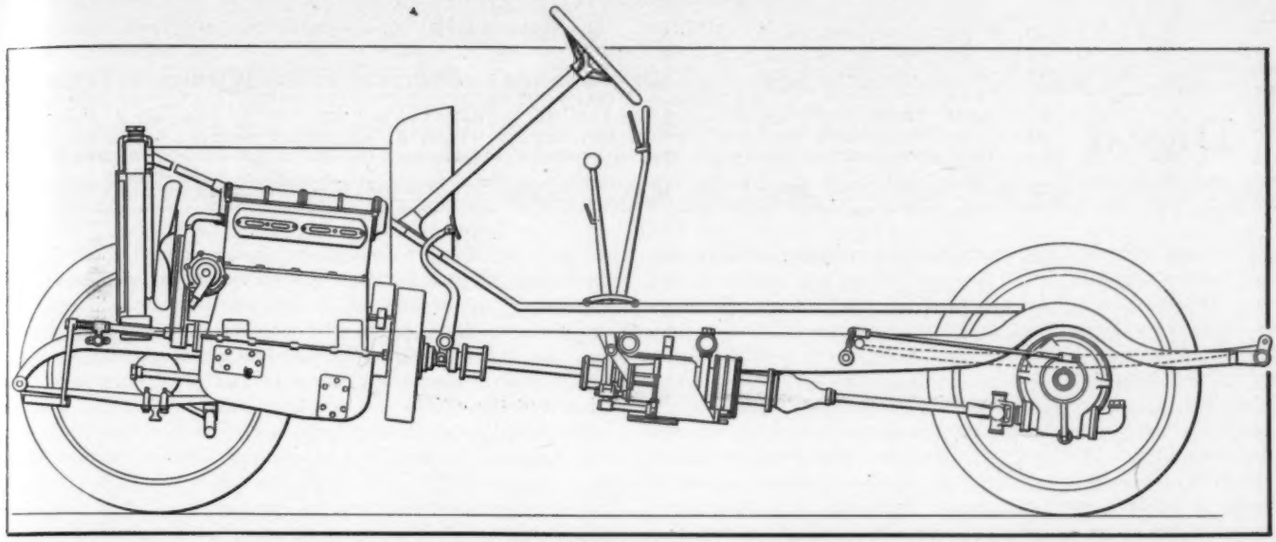


Fig. 2—Side view of Knight Daimler chassis, showing straight line between engine, gear box and rear construction, worm drive and upswept frame

versal joint on the propeller shaft from a great deal of wear. As in usual slide valve practice the exhaust and inlet manifolds are placed on opposite sides of the motor, the designs of which are very clean. Ball bearings are fitted to the crankshaft and there is also a thrust bearing at the forward end of the crankshaft. The chain wheel that drives the eccentric or valve shaft is located at the rear end. The pump and magneto being driven by helical gear from the front end makes these organs very accessible. The carbureter has two jets, and a similar system to that used by the G. & A. (recently described in THE AUTOMOBILE) is employed for the extra air intake, consisting of a series of balls that are lifted from their seats by the engine suction.

The lubrication system on this new 12-horsepower model, says *The Autocar*, is decidedly interesting and ingenious, and is the subject of a special sketch given herewith. A sump is formed at the bottom of the crank chamber, and situated therein is a plunger pump driven by an eccentric off the eccentric or valve shaft. In connection with the base of the pump is an oscillating two-way valve operated from one of the eccentric pins on the valve sleeves, the function of this two-way valve being to open up the pump barrel as required to allow oil to enter on the suction stroke at one side, or, on the other side, to find exit on the pressure stroke to the main oil lead shown in the sketch. The oil from the pump is delivered to a shallow trough at the front end of the engine, and thence gravitates, owing to the rearward inclination of the engine, over the surface of a foundation plate to four main troughs, one under each connecting rod. The surplus oil from the fourth trough finds its way by gravity back to the sump in the usual manner. On each side of the row of troughs is placed a baffle-plate extending along their whole length, so that when the oil from the earlier of the four troughs is splashed out by the connecting rods it runs back on the foundation plate and thence to one of the other troughs. A new feature in connection with this type of lubrication is that the depth to which the connecting rod ends dip into the oil is varied to suit different conditions of running. The foundation plate of the troughs is anchored upon two rods, which in turn take bearing upon four short levers, one at each corner. By these means the troughs can be raised or lowered in their position relative to the connecting rods, the controlling rod of this motion being interconnected with the throttle. When the engine is running at slow speeds with the throttle nearly closed, the connecting rod ends only just reach the oil level, but gradually, as the throttle is opened, the troughs are raised, and, as required by the conditions obtaining at the moment, the engine receives more and more oil. It is claimed, and seems probable, that economy of oil will result from this arrangement, for with fixed troughs the amount of dip allowed to the connecting rods must naturally be sufficient for all and any conditions, resulting sometimes in oil being wastefully used at low speeds when but little is really required. Smoking from over-lubrication is also reduced to a minimum.

The transmission gear arrangements follow usual practice, three speeds and reverse being fitted, with worm drive, the inclination of the crankshaft allowing a practically straight drive from crankshaft to the worm under the back axle.

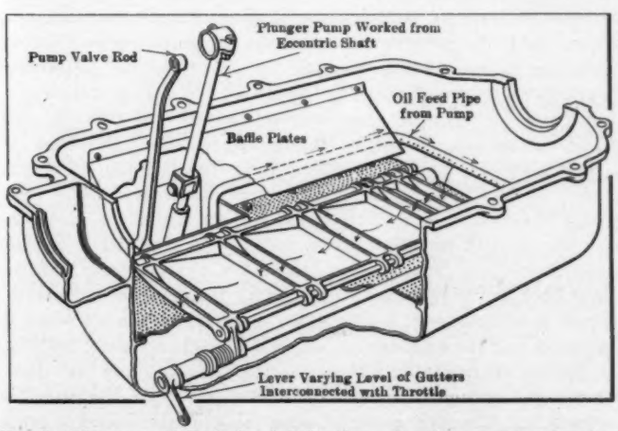


Fig. 3—Diagram of Daimler lubrication, showing varying level of gutters

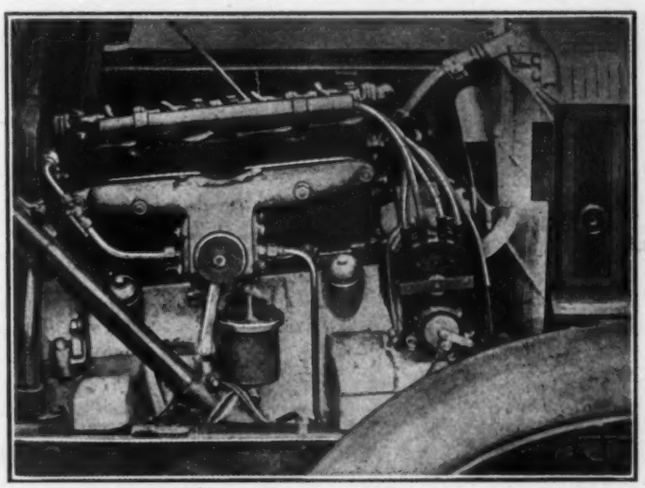


Fig. 4—Intake side view of Knight engine, showing clean intake manifold, accessibility of magneto and water connections to carbureter

Digest

EXTRACTS FROM CONTINENTAL JOURNALS ON SUBJECTS ALLIED TO AUTOMOBILE ENGINEERING: KEROSENE MOTORS FOR BOATS—DESCRIPTION OF SABATHE MOTOR—NOISE FROM TRANSMISSION GEARS—COMPOSITION OF BENZOL—INFERIORITY OF PLANTATION RUBBER

Ordinary automobile motors are unanimously condemned for marine purposes, according to the reports made to the "International Congress on the Application of Internal Combustion Motors to Marine Craft for Naval, Commercial, Fishery and Pleasure Purposes." The fact that the kerosene motor has not yet become exclusively adopted for these ends in French waters is ascribed to the unfavorable conditions created by the import tariff. In the recent contest conducted by A. Lumet for the Automobile Club of France, the Sabathe motor was adjudged superior to the competing motors of Danish and American manufacture which have been used by the thousands for fishing boats for a number of years, and also superior to the Aster and the Peugeot-Tony Huber, competing French kerosene motors. The author describes the Sabathe and the Diesel motors, and dwells on the principles of ignition as modified by the nature of the fuel, with special reference to the Sabathe type. If one were to employ kerosene in gasoline motors of high rotary speed and light parts there would be trouble. With an almost constant maximum power output and a gasifier giving a fulminating mixture, this type of motor will not last. The explosion must be tempered by injection of water, but this method for regulating combustion is exceedingly delicate and can be achieved only in stationary practice. Reduction of the compression reduces efficiency. To effect complete combustion of kerosene in a motor of high rotary speed is rendered difficult by the time required for vaporization of kerosene except at high temperatures. Ignition by high-tension magneto is impracticable, as the spark will not burn an unexplosive mixture. The low-tension magneto does better, but a jet of flame is the only really suitable means. As the mixture ignites only with difficulty, there should be an effort for concentrating its molecules by compression up to the point where self-ignition is reached. At this point the flame jet will be necessary to assure precision in the timing of the ignition, and these considerations explain the hollow hot wall ignition chambers or balls with which the "Dan" and the Mietz & Weiss kerosene motors are equipped. Both turn at 400 to 500 revolutions per minute and the mixture is not prepared outside the cylinder. Only the air is compressed and the kerosene is injected at the end of the compression stroke and burns rapidly after self-ignition. In the Diesel motor the air is compressed at the rate of 30 to 35 kilograms per square centimeter, which raises the temperature to 500 deg. or 600 deg. Cent. The kerosene is injected near the dead center, the rule for its injection being determined by the condition that the temperature shall increase as nearly as possible in the same proportion by the combustion as it is reduced by the piston displacement. This feature is termed the isothermic expansion. The injection is then discontinued and the expansion continues adiabatic.

In the Sabathe motor, which functions according to the cycle of mixed combustion, the air is also compressed at the rate of 30 kilos and a temperature of about 600 deg. Cent. is produced. The fuel is injected in two doses. The first portion is injected before the dead center and serves to raise the compression to 40 kilos per square centimeter. The second portion is so injected as to produce a combustion giving substantially constant pressure. But when less than normal power is required of this motor, the second dose is omitted and the first dose burns in that case with "constant volume." The Sabathe motor which was tested by Mr. Lumet had the following measurements: 220 millimeters bore, 220 millimeters stroke, 350 revolutions per minute. The number of cylinders was three. It has been submitted in another form to tests by the navy department, having a bore of 485 millimeters, a stroke of 480 millimeters, four cylinders and 700 effective horsepower at the normal speed of 300 revolutions per minute. It is reversible by displacement of the camshaft while running. It weighs 19 tons, including an air compressor, making its weight per horsepower 30 kilograms. The lower half of the pressed-steel crank casing, comprising the supports for the crankshaft bearings, is mounted on a cast foundation, and the cylinder jackets are bolted to the upper portion of the casing, supporting the cylinders by means of projecting annular flanges, so that the cylinders may be turned around their axes if required. The pressed-steel piston is cooled by spraying from a pump actuated from the crankshaft. To provide perfect tightness of the piston and obviating the danger of fire from escaping gases, the spaces between piston rings is closed by rings of anti-friction metal, and the space below the piston rings is similarly closed, four anti-friction metal rings being used here. The half-speed camshaft actuates the admission and exhaust valves, the kerosene fuel injection valve and the compressed-air valve by which the motor is started. The kerosene flows to a chamber below a valve which is centered around and slides on the discharge needle, and the valve is raised by means of two lugs secured to the needle. When small power is required, the kerosene fills this chamber, and when the needle is raised the fuel is injected and burns at "constant volume." For greater power, more fuel is admitted and passes to above the valve, and when the needle is raised, causing the kerosene in the chamber to be discharged first, the lugs come in contact with the valve and take it with them in their upward movement. And then the kerosene which is above the valve, being subject to pressure from the compressed air, enters into the cylinder where it burns, the progress of the combustion depending upon the profile of the cam, which is designed to produce approximately a constant pressure. Kerosene pumps, one for each cylinder, distribute the fuel. They are actuated by cams and pistons and their discharge is regulated by varying the shape of the cams. Two air compressors are used for this motor, one being operated from the crankshaft and reducing the power of the motor to 650 horsepower, while the other is operated by a special motor. The small Sabathe motor intended for fishing boats developed at the tests 36.9 horsepower and used 0.309 kilograms of fuel per horsepower hour and 0.015 kilograms of lubricating oil. At half angular speed the corresponding figures were 0.399 and 0.028.—*La Vie Automobile,* September 17.

Among the causes of noise from transmission gears, which make the vehicle "sing," a writer mentions the following: Long shafts, ball-bearings, deformation of gears due to the hardening process and not properly rectified, the tangential speeds of the gears, the shape of the gear teeth, the quality of the metal used in gears, shafts and casings, the shape of the casing, the suspension of the casing in the chassis or subframe. The effect of long shafts may be directly one of vibration or it may be the noise due to the less perfect mesh resulting from the bending of a long shaft. It is claimed that ball-bearings take play much more rapidly than plain parallel bearings, and the writer points to the noiseless motors in which parts are moved with much greater speed than in the transmission, but which, nevertheless, make no sound because the bearings are all plain. He proposes to have the subject investigated by building two cars identical in all respects, excepting that the bearings in one should be plain and in the other on the ball-bearing plan. It is claimed that the more the transmission casing approaches the cylindrical form the less sound is emitted, and also that a steel casing "sings" less than one made of light metal. It is suggested to interpose a thin layer of soft

metal between the crown of a pinion and the spider or shaft.—*La Pratique*, September 10.

Investigations of the elasticity of rubber derived from varied sources have been begun by Dr. J. C. Willis, director of the botanical garden at Peredeniva, and have already resulted in establishing the fact that rubber which comes from the plantations, whether in Asia, Africa or Oceanica, is inferior to the rubber which grows wild in the same regions in the forests. Its elasticity varies unaccountably, being very good in some cases and very poor in others without it being found possible so far to arrive at any explanation of the variation.—*Omnia*, September 17.

[While all reports relating to the rubber supply, even those apparently best authenticated, must be received with some degree of distrust, owing to the stock manipulations which are constantly taking place in the rubber market, the above report gains interest from the implication it contains to the effect that the plantation rubber in some instances, though these be rare, is found even better than that grown in the forests. Investigation of the causes should eventually lead to a systematic culture by which the plantation rubber may be rendered uniformly superior, and thereafter a rubber famine would become practically impossible and adulteration unnecessary.]

Benzol, now largely used as automobile fuel in Germany, and somewhat in France, is a mixture of benzine, toluene and xylene. The 90 per cent benzol, which is the grade employed for automobiles, contains about 84 per cent. benzine, 15 per cent. toluene and 1 per cent. xylene. The 50 per cent. benzol, which is usually a crude and impure product, contains only 60 per cent. to 65 per cent. of benzine. The specific gravity of 90 per cent. benzol at 15 deg. Cent. is 0.885. Benzol as extracted from coal by dry distillation is a by-product either from the manufacture of illuminating gas or that of coke. In point of fact nearly the entire output of benzol is now derived from the cokeries connected with the steel mills. Here the gases resulting from the distillation are generally utilized for heating the very furnaces in which they are produced and play only a secondary economical part. There is nothing to hinder the removal of all the benzol which they contain. Each ton of coal used in the cokeries yields 4 to 5 kilograms of benzol, which is ten times more than may be obtained by treating the tars from the gas plants.—*Cosmos*.

Among the means discussed for getting high power from a motor by increasing the number of revolutions and thus avoiding an increase of weight, the employment of a fan or air compressor for forcing as large an explosive mixture into the cylinder at high speed as the cylinder is capable of taking in by its own suction at the lower speeds has exerted great fascination over the minds of designers, and recently the designers of aviation motors have taken up the idea. As well understood, the standard automobile motor shows a torque curve shaped as the back of a shad, because it is impossible to draw in as large a charge at high speed as at low speed, and the force of each explosion is reduced in proportion to the amount of fuel consumed in it, granting that the mixture is maintained constant in composition. A motor which would give a straight line torque curve, the power being strictly proportionate to the number of revolutions, is conceivable by two means. Either the charges introduced at the low speeds must be throttled or those at high speed must be forced. When the question is of producing a maximum of power only the latter alternative is of interest. A motor of 100 millimeters bore, which may give 10 horsepower at 1,200 revolutions per minute, should with a successful system of forced admission give 48 horsepower at 4,800 revolutions per minute. Supposing such a motor could be made to operate, as perhaps is possible, it would lack the flexibility which the automobile motor now derives from the very fact that the power does not drop as rapidly as the number of revolutions per minute. For example, on a hill the number of revolutions dwindles, but the power keeps up pretty well, because each explosion does more work than at the higher motor speed, and as a result it does not become necessary to change gear. With a view to obtaining a maximum of power, it is more important that any small motor designed to produce power by increase of the motor speed would need to be constructed with all its organs of extremely robust dimensions. The cylinders would need thick walls, yet the cooling would have to be very energetic, and a large quantity of water would have to be carried. The radiator would need to be large and the lubrication system more effective than any now in use. With the reciprocating parts heavy enough for their work and most carefully balanced to offset the effect, as far as possible, of their increased weight, it seems very unlikely that the proposed system of forced admission could be materialized at as low a weight per horsepower as is attained by the methods now actually adopted in the most advanced practice; namely, by a long stroke which diminishes the rotary speed while increasing the piston speed and by multiple valves of large areas which assure a good filling of the cylinders even at high rotary speed.—*La Vie Automobile*, September 17.

Generating teeth from a rack-shaped cutter of the Sunderland type of gear shaper is the latest idea in shop equipment in England. It is claimed by the makers of this type of machine that the cost of doing the work is lower than when the hobbing machine is used, and that it is more accurate.

Coming Events

CALENDAR OF FUTURE HAPPENINGS IN THE AUTOMOBILE WORLD THAT WILL HELP THE READER KEEP HIS DATES STRAIGHT—SHOWS, RACES, HILL CLIMBS, ETC.

Oct. 18	New York City, Madison Square Garden, Electric Car Day at the Electric Show.
Dec. 1	Chicago, Ill., First Annual Aeronautical Exhibition in the Coliseum.
Dec. 31-Jan. 7, '11.	New York City, Grand Central Palace, Eleventh Annual International Automobile Show.
Jan 7-14, 1911	New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Manufacturers.
Jan. 15-21, 1911.	Detroit, Wayne Gardens, Detroit Automobile Dealers' Association.
Jan. 16-21, 1911.	New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Jan. 28-Feb. 4,'11.	Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Pleasure Cars and Accessories, Exclusively.
Feb. 6-Feb. 11,'11.	Chicago Coliseum, Tenth National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc., Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.
Mch. 4-11, 1911	Boston, Mechanics' Building, Ninth Annual Show, Licensed Automobile Dealers' Association.

Races, Hill-Climbs, Etc.

Oct. 14-18	Washington, D. C., Start of Washington Post Reliability Run to Richmond, Va.
Oct. 15-16	Philadelphia, Roadability Run, Automobile Club of Philadelphia.
Oct. 15-18	Chicago, Ill., Chicago Motor Club's 1,000-Mile Reliability Run.
Oct. 22-30	Belmont Park, New York, International Aviation Tournament and Show of Licensed Automobile Dealers of New York City.
Oct. 27-29	Dallas, Tex., Track Meet.
Oct. 28-29	New York City, New York "American's" Motor Truck Contest.
Oct.	Exhibition Auto vs. Aeroplane, Dutchess County Fair, Poughkeepsie, N. Y.
Nov. 3-5	Atlanta, Ga., Speedway Meet, Atlanta A. A.
Nov. 5-6	New Orleans, La., Track Meet.
Nov. 10-12-13	San Antonio, Tex., Track Meet.
Nov. 11-12	Savannah, Ga., Grand Prix, Automobile Club of America.
Nov. 24	Redlands, Cal., Hill Climb.
Nov. 24	Savannah, Ga., Road Race, Savannah Automobile Club.

THE AUTOMOBILE

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The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

THE broad field of the automobile includes three generic types of machines, i. e., the steamer, then the electric, and finally the gasoline car, named in the order of their commercial introduction, with some mixing of dates, which might afford ground for controversy without affecting the points that are to be made here.

* * *

GRANTING that the steamer has survived, the fact remains that it is extremely well represented by a very limited number of designs, and it has been admitted by men who have made a study of the situation that activity in this field has been suppressed largely on account of the concentration of basic patents, thus prohibiting those who might like to build steamers from making a stable investment.

* * *

WHETHER or not it is a good idea to suppress broad activity by enforcing patent rights is too much of a subject to be handled with brevity, but the fact remains that the internal combustion motor, using gasoline at $32 per ton for fuel, has almost monopolized the field, although it, too, is somewhat affected by the patent situation.

* * *

ELECTRIC vehicles occupy a unique position in the battle for automobile supremacy. If they have failed to make sufficient headway, it is because the problems involved are insurmountable to the average engineer, and the work to be done must be assigned to the hands that respond to the motive power of a sufficiently vigorous set of brains.

* * *

EVERY trolley car in America pays tribute to the qualities that reside in electric motors, and the electrical method of doing work is so thoroughly established in a thousand ways that to come to its defense would be a waste of ill-directed effort.

* * *

SINCE it is not feasible to attach a trolley pole to a vehicle that is not confined to tracks, the source of electric energy must reside in a battery. It is in this battery problem that the retarding factor has ever resided, but despite the shortcomings of batteries of past history the electric vehicle has survived and thrived.

* * *

WHEN a doctor refers to a man with "vulgar" health, the possessor thereof is regarded as capable of devouring raw clams without being discommoded, and it is this vulgar health that has been missing in batteries as they were utilized in connection with electric vehicle work.

* * *

THE hope of the new generation from the electric vehicle point of view lies in the future good performance of the nickel-iron battery. It is a great misfortune that its qualities are under the shadow of too much talk. The public ear seems to have been wide open and the rubbish that has been poured into it for four or five years has clogged it up.

* * *

THE time has arrived when the plain truth is the only medicine that will be of any value whatever, but this truth will have to emanate from unbiased and reliable sources. That there is a reservoir of truth it is believed. The sooner it is permitted to flow through an unpolluted conduit, and its pure stream is focused upon the debris that litters up the public ear, the better it will be for all concerned.

* * *

CONVINCING evidence abounds at every hand which clinches the contention as previously made to the effect that despised stock cars are showing superiority over special racing machines, and the most substantial affirmation comes in the report of the Fairmount Park automobile race. A perusal of the tabulation of the score card, as printed elsewhere, shows that it was a stock car victory, and that foreign racing machines made a very poor showing.

* * *

THE time was when only specially made models were worth entering a race, and one of the strange things about these special models lies in the fact that very few of them ever finished. Those who abhor racing, and throw their weight against utilizing the automobile for such purposes, will scarcely need worry about it; as the situation presents itself now, there are so many stock cars crowding in at the finish that it lifts the whole performance out of the racing category. The life of racing depends upon a hard contest for the winner, the placing of two or three cars at the most, and a pack of wrecks.

LAPSE OF 10 YEARS

"Road 12.47—"

BY MARIUS C. KRARUP—THE DEWEY INDEX SYSTEM APPLIED TO ROADS, MAPS AND GUIDE BOOKS—A BOON FOR TRAVELERS AND TOURISTS—A BOOST FOR A NATIONAL ROAD SYSTEM

JUST because the United States is not yet a finished country, but one whose institutions are largely open framework to be filled out as modern progress shall dictate from time to time, the opportunities for improving here upon suggestions received from the more systematic but less elastic governmental supervision of public affairs which prevails in Europe are practically without limit. In matters of road building and road improvement American conditions have presented special difficulties, due to the predominating importance of railroads, to the relatively low prices for land, to the relatively thin population, to the scarcity of accumulated capital, as compared with the large number of undeveloped enterprises begging for investment, to the high cost of road construction, to the absence of military necessities and to a certain stiff-mindedness, which is essentially sound and goes with the institution of self-rule for communities, but which, on the other hand, delays and impedes all united effort from which direct economical reward is not self-evidently to be the result. Under these circumstances the American road system has probably been developed as rapidly as reasonably could have been expected and, when everything is said, perhaps more rapidly than that of any other country, although a much earlier start has given other countries the lead for the present. Comparison on more nearly even terms could be established with reference to the modern problems of rendering roads dustless and with regard to the suitability of the means adopted in the various countries for reducing the cost and improving the quality of the roads beyond the traditional standards for judging quality, in which respect America has a free hand and wider scope than Europe and ought to be leading.

The ultimate purpose of roads is, of course, to afford the best possible facilities for the transportation of persons and goods from one place to another, and to have these facilities accord with the tastes and preferences of the population, as well as with all economical and financial requirements. All other advantages of a perfect road system may be summed up as a general and very effective tendency toward raising the standard of civilization by advancing co-operation between town and country in business and pleasures, but these, however important, are only incidental.

In order that people may be enabled to travel with facility and dispatch from one place to another over a network of roads, by day or by night, not only roads of good quality are required, but it is necessary that the traveler shall be able to pick his way without tedious inquiries, often resulting in unreliable answers, and without risk of straying from the good and the short road to the bad and the devious one. Signposts and guide books and maps serve this purpose in a most cumbersome manner, as all tourists know, mainly because no rational system has been devised for distinguishing the road which leads to A from the road which leads to B. Signposts as a rule indicate only the nearest town, and the traveler whose destination is farther on must consult his memory, his map or his book to make sure whether that town is on his best route or not. The two roads look alike in the landscape or, if they look different, the meaning of the difference is not clear. Means for identifying the road in the landscape with the lines which mark the road on the map have been developed ingeniously by private enterprise, but depend on scattered landmarks, far between, on the cyclometer reading and on a nomenclature for the roads which is not always recognized locally, neither in word of mouth or by inscriptions on signposts. The name of a road, if one exists, is necessarily either lengthy or indefinite. To paint it on signposts is expensive, and it is not done.

These troubles for the traveler exist in greater or lesser degree in all countries. They have been accentuated through the universal use of automobiles. They interfere seriously with that freedom of movement which is one of the chief charms of automobile touring, and by that much they lessen the value of automobiles as well as of roads. In the countries of Europe, however, and particularly in France, where the care of roads and bridges is in the hands of the department of *Ponts et Chaussées,* the roads are listed in the archives of the administration and on the maps used for its officials, by number. The national pike is marked N. 32, or whatever the number be. The departmental chaussée is marked D, followed by the numeral distinguishing it from other departmental chaussées, all of which are in the same class. The road of *"grande communication,"* or highway, is marked such as G. C. 67 or G. C. 289, and even the roads of lesser degree and excellence are denoted by the initials of their class and a distinguishing number. A prominent tire manufacturer in France, who is naturally much interested in fostering touring, discovered that it would be a great help to have the official designation by class and number extended to the maps in the hands of the public, and he had such maps printed. Their usefulness was much reduced, however, because the numbers were not to be found on the roads themselves. He proposed that signposts and kilometer stones should be marked with the numbers, too, but nothing was done. Others have taken up his cry, but the hide of French administration is thick. The local authorities are averse to expense, even one which would seem petty in America. The speed of automobiles on French roads is so high that rural communities look with scant favor upon anything which might make it higher or the number of automobiles greater.

Not France but the United States is the country which needs the numbering system most, and, starting with a clean slate, the United States has an opportunity for developing the numbering system in a modern manner and rendering it much more thorough and useful than it could be made on the basis of the existing French official classification. The Dewey system for card indexing and for finding one's literary way among the labyrinthine shelves of a big library offers a solution whose manifold advantages for the traveler and eventual influence for the orderly development of an economical road system can scarcely be fully perceived at the first glance. As is well known, the Dewey system gets definition and boundless elasticity alike by the simple use of a period and decimals. Large and fundamental divisions of a subject are classified by the numeral to the left of the period and all subdivisions by the decimals. A designation such as 123.147 indicates the seventh subdivision of the fourth classification under the first distinct branch of subject No. 123. It may just as well be made to indicate the seventh country road branching from the fourth county road running from the first State road starting from trunk highway No. 123. Evidently a road—if it is not in the immediate vicinity of some highly specialized destination, such as one of the minor streets of a village or a country place reached by a number of private lanes—may practically always be indicated as briefly as, for example, 26.94. The finesses of the Dewey system by which more than nine subdivisions of the next higher classification may be included are not required for road classification. The signposts need not give room for more than a few numerals, usually not more than three or four. The expense of painting these brief indications on a post, with or without crossboard, is slight. The posts need not be higher than three feet above the ground. Indeed, to facilitate night driving, the low location of

the numbers is preferable, as in that case the light from the lamps of an automobile may be turned upon them without special difficulty. But at all events an arrangement by which a small lamp attached within reach of the driver may be turned so as to throw a cone of light in any desired direction, high or low and to the side, would be a small price to pay for the convenience of knowing the road with certainty in the dark. To insure absolute definition, it might be desirable to paint a horizontal line on that side of the number which points to the beginning of the road, and on a signpost at one side of the road this line would precede the number while on a signpost at the opposite side it would follow the number. Rapidity in deciphering a sign while driving would be served by painting the leading number larger than the decimals. A sign, then, would look as follows:

—12.47 or, on the other side of the road, **12.47—**

A traveler having directions to follow trunk road 12, State road 12.4 and county road 12.47, would not need to trouble himself about crossroads, as he would know that any crossroad, starting from a different trunk road would have a different initial numeral or, if by some rare chance of devious ramifications it came back across the trunk road to the system of which it belonged, it would be denoted by more than one or two decimals. On the other hand, if his directions told him to follow 12, then 13.5 and finally 14.7, he would know that 13.5 was a road crossing and not branching from 12, and similarly that 14.7 was a crossroad with relation to 13.5.

Just as French officials know by the prefix N or D or G.C. of what degree and quality a road should normally be, the American traveler would have a strong indication of the quality by the number of decimals, provided the whole numbering system were laid out with some reference to the importance of the different roads.

At this point the question arises, how the authorities may be made to co-operate in instituting a numbering system and instituting it in the best possible manner. The first requirement for obtaining a suitable foundation would seem to be the selection of trunk roads. In practice they do not exist, but there exists a network of roads varying in quality, by which a traveler can get from New York to Buffalo or from New Orleans to Chicago by following a stretch of good road here and a stretch of bad road there. The long-distance haul is of no importance; hence a straight line connection between distant points is less to be aimed for than a trunk road following the lines where a considerable established traffic justifies the expense of road improvement. The trunk roads should, then, follow the lines of established traffic as closely as possible. Preparatory work is wanted for ascertaining beyond dispute the amount of traffic over various routes throughout the United States. The trunk roads should connect these routes on the plan of securing the largest possible traffic per mile. By counting the traffic on predetermined (but not necessarily advertised) days and simultaneously at a large number of points, the mileage as well as the number of the travelers could be approximately fixed, and the short-distance, inter-village traffic would not count for more than it should. Apparently a special road commission, specially authorized by Congress, would be required for uniting all efforts and laying out on the map the system of trunk lines from which a numbering system would have to take its beginning. The drawing of a bill specifying the composition, the authority and the work of such a "Special Federal Commission for Preparing a System of Road Numbering" would seem to be the first step to be taken. And at this point the suggestion may be left for the present.

Many 1911 Models at National Vehicle Show

CHICAGO, Oct. 11—The motor car division of the National Vehicle Show which opened in the Chicago Coliseum yesterday formed no inconsiderable part of that affair. Twenty-four different makes of cars are represented by sixty-five machines. The Martin Carriage Works of York, Pa., has on view three commercial motors in addition to its regular line. There are two huge Sternberg trucks, the Kisselkar Leviathan, the Hupmobile, Cutting and Owosso lines.

In the Auditorium proper, there are eighteen different makes, including the Warren-Detroit, the International Harvester, Studebaker, E-M-F and Flanders, the Powercar and the Ames, besides five Imperials, two Schachts, three Patersons, three Lamberts, four Whitings, one Staver, three Readings, six Michigans, two Zimmermans and four Abbott-Detroits.

International Show Dates Announced

Formal announcement of the "Eleventh International Automobile Show" to take place in Grand Central Palace, New York, from December 31, 1910, to January 7, 1911, has been made by the American Motor Car Manufacturers' Exhibit Association.

The association has announced that it has been working on the details of the show since last January and declares that so far the prospects for a successful show are excellent.

Big Dash to Phoenix from Los Angeles

Eleven entries are of record in the run that is to take place from Los Angeles to Phoenix, Ariz. The run will start from the Hollenbeck hotel on the night of November 5. Entries will close October 21. A four-cylinder Knox car, driven by Joe Nickrent, accompanied by his father and brother, left Los Angeles last Thursday to make the preliminary dash. This is to be the big event of the year in Southern California. The entries now include Maxwell, Kissel-Kar, Apperson, Ohio, Pope-Hartford, Velie, Ford, Rambler, Franklin, Mercer and Knox cars.

Atlanta Meet Has 45 Entries to Date

ATLANTA, GA., Oct. 11—Work is nearly completed on the surface of the Atlanta track and it is practically ready for the practice work for the Fall Speedway meet, set for November 3, 4 and 5. A considerable strip of the back stretch has been torn up and resurfaced, a couple of thousand small holes in the surface have been filled in and the bumps have been thoroughly tamped down. Entries to the number of 45 have been received.

Electric Vehicle Association to Meet

The First Annual Convention of the Electric Vehicle Association of America takes place at the concert hall of Madison Square Garden October 18.

The meeting will be of interest to manufacturers of electric vehicles, storage batteries and their attendant appliances; to those representing central stations as indicating a field in which exist large possibilities of future growth; to those considering the use of electric vehicles, and especially to those who are engaged in the practical work of operating and maintaining transportation equipment of this type.

An interesting and practical program has been arranged.

Selden Cases Set for November 9th

A motion was heard Monday by the U. S. Circuit Court of Appeals for the Second Circuit, to give preference to the hearing of the appeal in the suits under Selden automobile patent against the Ford Motor Company and Panhard Company and the other test suits. The court has set these cases, which are on appeal from the decision of Judge Hough sustaining the Selden patent, at the head of the Court of Appeals' calendar for hearing November 9.

In the case of injunction under Selden patent against John Wanamaker, a motion was brought by the defendants to suspend. This was opposed and Judge Hough denied the application for suspension, so that the injunction continues in force.

Recent Events Among Aviators

NO CHICAGO-NEW YORK CONTEST—ALTITUDE RECORDS—NEW PRIZE FOR BELMONT PARK MEET

THE number of fliers competing for the $25,000 prize offered by New York and Chicago papers for a flight between these two cities was finally reduced to one before the start was made. The two others made a perfunctory hop over the fence of the Hawthorne racetrack and retired, this action being in accordance with an agreement made between the fliers themselves and ratified by the newspapers in question. Among the three entrants, Eugene B. Ely was the one selected to fly, while J. A. D. McCurdy and C. F. Willard retired in his favor and offered to do all in their power to help Ely finish the flight, by placing spare motors and parts at his disposal when needed. They are all identified with the Curtiss type of biplane. In the views offered in explanation of the change of plans on the part of the aviators, who may be considered as a Curtiss team, it is stated that none of the special aviation motors at the disposal of the fliers could be expected to endure the strain of being operated near its full capacity for seven days in succession, even only for a limited number of hours each day, and that consequently any contestant, in order to have reasonable hope of reaching New York, must have several motors at his disposal, a condition which, for lack of motors, could only be met by two of the contestants traveling by rail with their motors and having them ready for the assistance of the third contestant when needed. Ely started from Chicago Sunday instead of Saturday, though the weather on Saturday was favorable. He had repeated troubles with the carbureter and by Monday night had reached no farther than East Chicago. After a repetition of his former troubles on Tuesday he finally announced his abandonment of the enterprise.

William R. Hearst, the owner of the Hearst chain of newspapers, has offered a prize of $50,000 for the aviator who first accomplishes a flight from Boston or New York to Los Angeles or San Francisco, going by way of Chicago and finishing the flight within thirty days after starting and before the expiration of one year after October 8, 1910.

Archibald Hoxsey in a Wright biplane flew on October 8 from Springfield, Ill., to the grounds of the St. Louis Country Club, at St. Louis, making a detour to Staunton, Ill., the aviator's home town, and covering in all a distance of 104 miles in one continuous flight. He started at 11:56 a. m. and landed at 3:35 p. m. Hoxsey's arrival was the signal for the opening of the St. Louis aviation meet, which will be continued until October 16, and includes an international balloon tournament. Five Wright biplanes are represented at the meet, and Alfred Leblanc will fly in his Blériot monoplane equipped with a 100-horsepower Gnome engine.

A new altitude record, beating that made by Chavez shortly before his fatal flight over the Alps, was made by Wynmaelen, a Dutch aviator, at Mourmelon, France, on October 1. According to the dispatches Wynmaelen used a biplane and reached a height of 9,174 feet. Descending without power in 13 minutes he suffered none of the nausea which overtook Morane when the latter descended in less than 8 minutes from a height of about 7,800 feet. The previous altitude record with a biplane was made by Brookins at Atlantic City with a motor of about 28 horsepower.

Léon Morane, with his brother Robert as a passenger, attempted on October 5 to win the Michelin prize of $20,000 for a continuous flight from Paris to Puy-de-Dôme, a mountain 4800 feet high, near Clermont-Ferrand, but fell near Boissy and broke one leg. His brother was probably mortally injured. The machine was a Blériot. Morane held the record for altitude with a height of 8,471 feet, which was subsequently beaten by Chavez. In one of his descents from a great height Morane shut off the spark without shutting off the gas, and the cooling effect resulting from the continued aspiration of vapor was sufficient to congeal the lubricating oil, causing the piston to stick and preventing the restarting of the motor.

Whoever at the International Aviation Meet beginning at Belmont Park, L. I., on October 22, shall fly from the aviation field to Liberty statue in New York harbor, circle the same and return to the grandstand in one continuous flight and faster than any other will receive a prize of $10,000 offered by Thomas F. Ryan for any performance which his son, Allan F. Ryan, the general manager of the meet, and De Lancey Nicoll might agree upon as most suitable. René Barrier, E. Audemars and Roland Garros are new foreign entries. Barrier will take the place of Léon Morane, using the latter's 100-horsepower Blériot monoplane, which had been shipped before Morane was injured. Audemars flies a Nieuport monoplane and Garros an improved Demoiselle, the diminutive monoplane designed by Santos-Dumont. Charles K. Hamilton is practising at Hemstead Plains with his new 110-horsepower biplane, which is said to be largely of his own design, and much interest is awakened in the competition for speed and endurance between this flier and the French aviators, Leblanc and Barrier, who use 100-horsepower Gnome engines and Blériot monoplanes.

"T. R." added the air to his list of conquests last Tuesday.

First Open-Air Show for New York Motordom

Announcement has been made that the Licensed Automobile Dealers of New York will take part in an exhibit of cars at the International Aviation Tournament, which is to be held at Belmont Park, October 22 to 30. M. J. Budlong, president of the association, has secured the exclusive right for the members to show their cars at the meeting. The floor space in the betting ring and under the grandstand amounts to 40,000 square feet available for exhibition purposes.

The show will be the first outdoor affair ever undertaken by the New York dealers, and in connection with the aviation meet is expected to draw an attendance of not far from 500,000.

The meeting has been sanctioned by the A. L. A. M.

Many Cars at Illinois State Fair Show

SPRINGFIELD, ILL., Oct. 11—Automobile exhibits formed an important item at the Illinois State Fair, held in Springfield, September 30 to October 8, thirty makes being shown, among them the Midland, Winton Six, Halladay, Westcott, Overland, Davis, Staver-Chicago, Case, Zimmerman, Inter-State, Lexington, Auburn, Regal, Black Crow, Glide, Rambler, Jackson, Cadillac, Studebaker-Garford, E-M-F, Flanders, Mitchell, Studebaker, Chalmers-Detroit, Stoddard-Dayton, Cutting and Velie.

Candidates Buy Lozier Automobiles

Lozier touring cars recently have been purchased by John A. Dix, Thomas F. Conway and Jay Cothron. All three are ardent motorists and forceful advocates of good roads. Messrs. Dix and Conway are leading candidates for high State offices.

Oldfield Falls Under Official Ban

Barney Oldfield was indefinitely suspended by the Contest Board, Tuesday, for insubordination and disrespect in advertising an unauthorized race.

The new Waters road ready for use

Near Ferguson Avenue, as level as a floor

Savannah Gets Grand Prix

BIG RACE TRANSFERRED FROM LONG ISLAND TO SOUTHERN COURSE AND WILL BE RUN NOVEMBER 12—CLASS RACE TO PRECEDE GREAT EVENT

SAVANNAH, GA., will be the scene of the second Grand Prize race for the emblem of the Automobile Club of America, sanction for the event having been recommended for that city at a meeting of the Contest Board of the club on Monday afternoon. The race will take place November 12 and will be preceded by a contest under piston displacement classes, November 11. While the exact limits of this race have not yet been defined, it is said that as many as five divisions under class B or C will be provided, but the probability is that the racers in this section will be limited to divisions 2 and 3 of Class C.

The conditions of entry to the big race will remain the same, that is, unlimited as to size and power, save for width, which must be less than 68.89 inches.

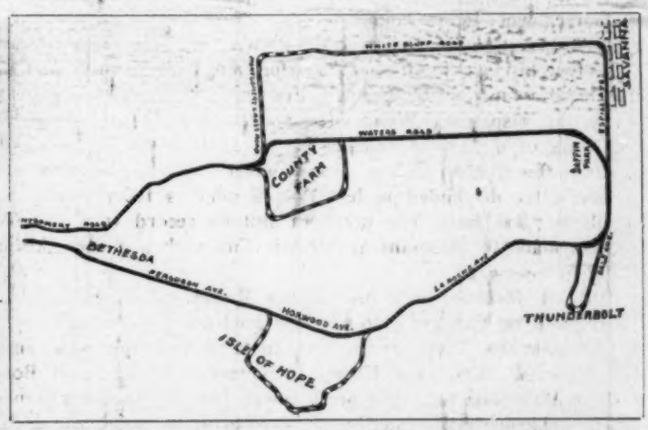
When the Motor Cups Holding Company abandoned the race, which was scheduled for next Saturday on the Long Island Parkway, several other cities applied for permission to stage the race. Among these were Savannah, Philadelphia, Los Angeles, Atlanta and Indianapolis. The city of Savannah, however, went after the race with a vim and dispatched a delegation to New York last Saturday consisting of Mayor George W. Tiedeman, Harvey Granger, O. T. Bacon and A. B. Moore, county commissioners, and Arthur Solomon, secretary of the Savannah Automobile Club, as well as several others.

These gentlemen conferred with the Contest Board of the club from Sunday afternoon until Monday evening, and at the conclusion of the deliberations the Contest Board announced that it would recommend a sanction for Savannah.

One of the considerations in granting the recommendation was the assurance carried to the Contest Board by the delegation that the Governor of Georgia would order out at least a regiment of State troops to police the Savannah course during both races.

The course, as promised by the delegation, will be 18 miles long, with only seven turns. The route over which the 1908 race was run was 25 miles with 19 turns. The improvements in the roads contemplate the following changes: The old White Bluff road will be eliminated. The starting point will be on Waters Road, which was used in the light car race two years ago. Much work has been done to perfect this stretch and it is in excellent shape. The course generally is composed of hard-packed cement gravel, the turns are banked rather high and all but two of them may be taken at speed. Leaving the Waters road, the course is laid out over the Intermediate road, Whitefield avenue, Montgomery road, Ferguson avenue, Norwood avenue, La Roche avenue, Thunderbolt road, Dale avenue to the Waters road. This route eliminates the Isle of Hope, as Norwood avenue cuts through in a direct line to Ferguson avenue and gives a straightaway of more than eight miles. The widest stretches of the course are about 50 feet and the narrowest 20 feet, generally level and as smooth as a billiard table.

Showing one of banked turns, ready for use—the speed possibilities are great



Savannah course, 18 miles in length, over which Grand Prix will be run—heavy line, new course; dotted line, old course

Draw Space for Chicago Show

MAKERS AND ACCESSORY MEN SECURE ALLOTMENTS AND ALMOST ALL ROOM IS ASSIGNED FAR IN ADVANCE

ABOUT seventy-five manufacturers attended the drawing for space at the Chicago show which took place at the office of the National Association of Automobile Manufacturers, Inc., last week. All the space for pleasure cars was assigned.

Applications from makers of commercial vehicles for such space as remains in the Coliseum and in the armory will be received up to October 31.

Following is a list of makers to whom space was allotted:

PLEASURE VEHICLE SECTION

Coliseum:

Winton Motor Carriage Co.
Buick Motor Co.
Stevens-Duryea Co.
Chalmers Motor Co.
National Motor Vehicle Co.
Pierce-Arrow Motor Car Co.
Moline Auto Co.
Hudson Motor Co.
Lozier Motor Co.
Reo Motor Car Co.
H. H. Franklin Mfg. Co.
Olds Motor Works.
Packard Motor Car Co.
Thomas B. Jeffery Co.
F. B. Stearns Co.
E-M-F Co.
Cadillac Motor Car Co.
Peerless Motor Car Co.
Maxwell-Briscoe Motor Co.
Willys-Overland Co.
Pope Mfg. Co.
E. R. Thomas Motor Co.
Locomobile Co. of America.
Dayton Motor Car Co.
Woods Motor Vehicle Co.
Columbia Motor Car Co.
Atlas Motor Car Co.
Premier Motor Mfg. Co.
Knox Auto Co.
White Co.
Matheson Motor Car Co.
American Locomotive Co.
Baker Motor Vehicle Co.
Corbin Motor Vehicle Co.
Elmore Mfg. Co.
Haynes Auto Co.
Metzger Motor Car Co.
Mitchell-Lewis Motor Co.
F-A-L Motor Co.

Coliseum Annex:

Brush Runabout Co.
Studebaker Bros. Mfg. Co.
Nordyke & Marmon Co.
Inter-State Auto Co.
Jackson Auto Co.
Bartholomew Co.
Babcock Electric Carriage Co.

First Regiment Armory:

Hupp Motor Car Co.
Waverley Co.
Dorris Motor Car Co.
Kissel Motor Car Co.
Selden Motor Vehicle Co.
W. H. McIntyre Co.
Pierce Motor Co.
American Motor Car Co.
Cartercar Co.
Austin Automobile Co.
Garford Co.
Royal Tourist Car Co.
Anderson Carriage Co.
Moon Motor Car Co.
Pullman Motor Car Co.
Buckeye Mfg. Co.
Speedwell Motor Car Co.
Fiat Automobile Co.
Diamond T Motor Car Co.
Auburn Automobile Co.
Streator Motor Car Co.
Simplex Motor Car Co.
Black Mfg. Co.
Rauch & Lang Carriage Co.
Ohio Motor Car Co.
Courier Car Co.
Midland Motor Co.
Chadwick Engineering Works.
Staver Carriage Co.
Schacht Motor Car Co
C. P. Kimball & Co.

Coliseum Basement:

Southern Motor Works.
Great Western Auto Co.
Metz Co.
W. A. Paterson Co.
Ohio Electric Car Co.
Enger Motor Car Co.
Benz Auto Import Co.
Cole Motor Car Co.
Westcott Motor Car Co.
Diamond Auto Co.
Otto Gas Engine Works.
Middleby Auto Co.
Lexington Motor Car Co.
The Carriage Woodstock Co.
B. C. K. Motor Car Co.
Rayfield Motor Car Co.
McFarlan Motor Car Co.
Parry Auto Co.

COMMERCIAL VEHICLE SECTION

Mack Bros Motor Car Co.
Mais Motor Truck Co.
The U. S. Motor Truck Co.
The White Company.
Hart-Kraft Motor Co.
Studebaker Bros. Mfg. Co.
Alden Sampson Mfg. Co.
Courier Car Co.
Peerless Motor Car Co.
Packard Motor Car Co.
W. H. McIntyre Co.
The Waverley Co.
Reo Motor Car Co.
Willys-Overland Co.
Cartercar Co.
Grabowsky Power Wagon Co.
The Garford Co.
Avery Co.
The Pope Mfg. Co.
American Locomotive Co.
Rapid Motor Vehicle Co.
Pierce-Arrow Motor Car Co.
Metzger Motor Car Co.
H. H. Franklin Mfg. Co.
Knox Automobile Co.
Kissel Motor Car Co.
The Gramm Motor Car Co.
The Kelly Motor Truck Co.
Harder's Fire Proof Storage & Van Co.
Adams Bros. Co.
Randolph Motor Car Co.
Chase Motor Truck Co.
Saurer Motor Trucks.
Chicago Commercial Car Co.
Lamsden Company.
Federal Motor Truck Co.
Automobile Maintenance & Mfg. Co.
Washington Motor Vehicle Co.
Economy Motor Car Co.
Marquette Motor Vehicle Co.
Monitor Automobile Works.
Clark Delivery Car Co.

1910 Edison Storage Battery

(*Continued from page* 612)

This monstrous abuse is at the bottom of all the failures that have been made heretofore, and it is yet to be said that the batteries used in vehicle work are made as light as possible, nor must it be forgotten that the lighter they are the more frail they will be. In central station work the questions of weight are handled on a basis of the advantage afforded from the investment point of view, and cognizance is taken of the fact that it pays to add to the weight of the battery up to the limit where the increased life ceases to pay the current rate of interest on the investment. In vehicle work, however, all such considerations are cast adrift; the sole requirement is to so design the battery that it will come within the allowable weight, afford the requisite energy for the desired radius of travel, and last long enough to make it worth while, taking into account the absence of electrochemical skill on the part of the owner of the car and the wish on his part to go somewhere and come back again.

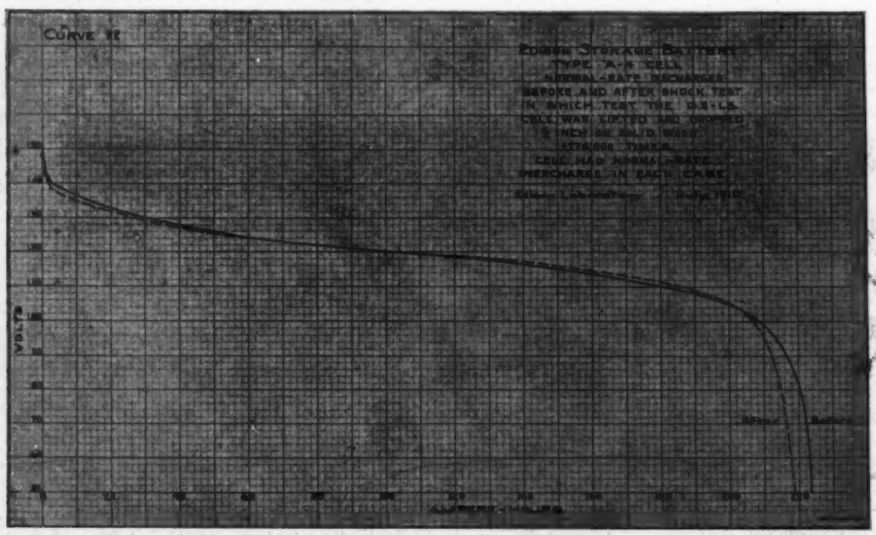


Fig. 3—Chart showing normal rate of discharge of a Type A-4 cell before and after shock test

The Edison vehicle battery, as shown in Fig. 1, is composed of a plurality of cells, made up of positive and negative elements in a steel can, the latter being sealed, and as the illustration shows, six of these cells of battery are joined together and assembled in a wooden crate. Three crates of cells are shown, but there may be any number, depending upon the potential difference required in charging, and the design of the charging equipment. The general appearance of the cells composing the battery is shown in Fig. 2, indicating five sizes, as used in general service, vehicle transportation, vehicle lighting and ignition work. These cells of battery are known at the Edison plant as type "A" or "B," and are marked A-4, if there are four positive elements, A-6 if there are six positive elements, and A-8 if there are eight

Detroit Automobile News

E-M-F CUT, NEW FOUR-PASSENGER MODEL HUPP, AND A DOZEN OTHER SUBJECTS OF LIVE INTEREST TO MOTORDOM GENERALLY ARE CHRONICLED

DETROIT, Oct. 10—Something of a stir was created last week by the announcement of the E-M-F Co. that it had decided to reduce the price of the E-M-F "Thirty" from $1,250 to $1,000, and the Flanders "Twenty" from $750 to $700. President Flanders gave as the reason for this action the fact that manufacturing facilities had increased to an extent where it was possible to make cars at this figure without sacrificing quality or workmanship and still have a reasonable profit left. It is strongly intimated, however, that an inkling that some other manufacturers were contemplating a cut in price was responsible for this sudden action on the part of the E-M-F Co. The cut was announced at a meeting of E-M-F branch managers.

Robert K. Davis, manager of the United Motor Detroit Co., Michigan distributor of the Maxwell-Briscoe and Columbia cars, entertained the company's Michigan agents at luncheon in the Griswold House, Saturday, when the policy for 1911 was outlined. Mr. Davis announced positively that there would be no cut in Maxwell and Columbia prices.

Another low-priced automobile claiming Detroit as its home will shortly make its appearance, announcement being made that before Nov. 1 the Hupp Motor Car Co. will place on the market a four-passenger car selling for $900. The car will have the same 20-horsepower motor that has been used in the Hupmobile, but will have a wheelbase of 110 inches and sell for $900. At the same time the Hupp Company announces that it will guarantee all its cars for life.

The Wolverine Motor Club, organized some months ago, and already counted among the most energetic of local bodies, is making a vigorous campaign with a view to securing 3,000 members by Jan. 1. A club house is also in prospect. The club has proffered the services of its members to Police Commissioner Croul in the campaign against reckless driving.

The Reo Motor Truck Co., of Lansing, has filed $1,000,000 articles of incorporation with the Secretary of State. R. E. Olds, James H. Thompson and J. Edward Rose, of Lansing, are named as stockholders.

The Motor Manufacturing Co., of Muskegon, has increased its capital stock from $100,000 to $150,000.

The Demot car plant will shortly be put in operation again, the receiver of the company having been ordered by the court to take such a course. The receiver has accordingly contracted with the Ross & Young Co. to do the machine work and assembling.

The Detroit Metal Founding Co. has been incorporated with a capital stock of $25,000.

The Oliver Motor Car Co. has just moved into its recently acquired plant in the western part of the city, and is installing mechanical equipment which will give it one of the best commercial car plants in the city.

Much of the uneasiness which prevailed in motor car circles has been removed by official announcement of the closing of the $15,000,000 loan by the General Motors Co. The news was particularly welcome in Flint, where it is taken to mean a speedy resumption of activities at the Buick and associated plants on a wide scale. Other General Motors plants throughout the State also expect to be favorably affected by the settlement.

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positive elements, or B-2 if there are two positive elements, and B-4 if there are four positive elements. The B-4 size is rated at 90 ampere hours, and besides offering a wide opportunity in ignition work, is available for the electric lighting of gasoline automobiles. The B-2 size is rather too small (45 ampere hours) for electric lighting and is confined to ignition work. The "A" series are designed specifically for electric vehicle service and street car work.

Of the remaining important general considerations not heretofore discussed, one takes into account the effect of shock and jar upon the battery and vehicle service, and in the Edison Laboratory a machine was devised by means of which a cell of battery undergoing a shock test is lifted and dropped (falling under the force of gravity) once every second, continuously, and this process has been going on for a couple of years, so that the effect of shock and jar upon the Edison battery was determined in this way. Fig. 3 is a chart so contrived as to show the normal rate of discharge of a type A-4 cell, before and after shock test, in which the cell weighing 13.5 pounds was lifted and dropped ½ inch on solid wood 1,776,000 times. The solid line in the curve represents the discharge before the shock test, and the dotted line is plotted from the discharge after the shock test.

The remaining general consideration, not considering electrochemical phenomena, involves the effect of short-circuiting the battery. Fig. 4 shows the apparatus used in the short-circuiting test, in which A-4 is the cell of battery, S1 is the breakdown switch, C1 and C2 are large diameter electrical conductors of very low resistance, used in making the connections between the battery terminals and the terminals of the switch. A1 is the ampere meter of the Weston type, with a shunt S11 used in conjunction with the ampere meter in taking the readings in amperes during the short-circuiting period.

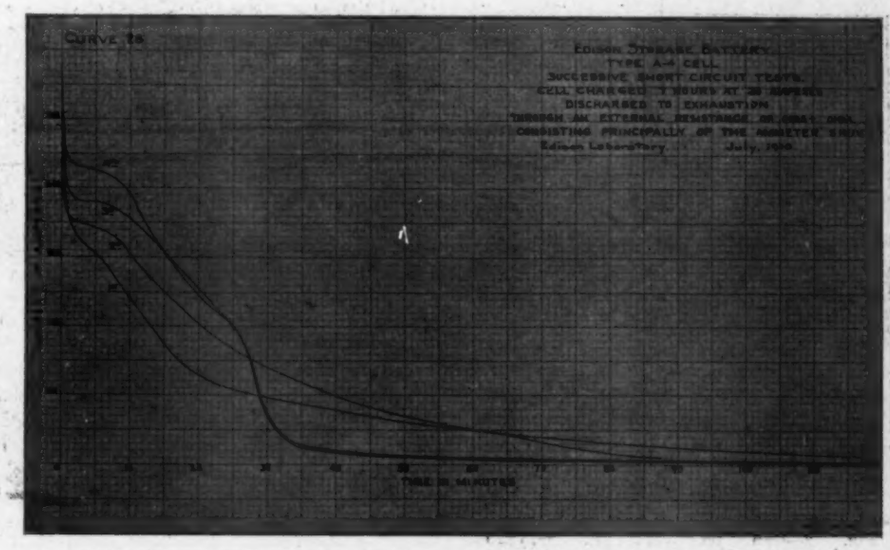

Fig. 5—Chart showing the discharge of a Type A-4 cell under short-circuiting conditions

Prominent Automobile Accessories

CONFORMS WITH THE LAW

A new lamp that fully complies with the law that compels cars in some States to have rear number plates illuminated at night has been placed on the market by John L. Parker Company, 62 Jackson street, Worcester, Mass.

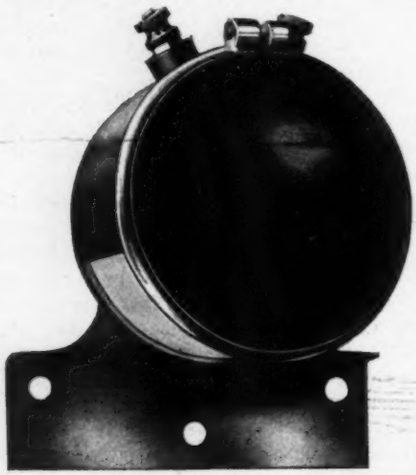

Fig. 1—A rear lamp that conforms with law

It is a combination lamp and number-plate holder and its appearance is very neat and compact. The large red lens is a semaphore pattern ruby and shows a clear light for a great distance. The bottom of the lamp is fitted with a clear white glass set in such a position that the light is thrown upon the number. The current is supplied from a six-volt storage battery to a two-candlepower lamp (Fig. 1).

LIGHT WHERE YOU WANT IT

To wash a car properly—and in the majority of garages it is necessary to carry this operation out at night—a good light is required. The ordinary ceiling or drop lights are inadequate as there is more dirt under the car than on the top surface. A handy portable wash rack light is marketed by The Brown Company, of Syracuse, N. Y., and when this is in use all other lights can be extinguished. It is easily portable and consists of a four-footed cast-iron base with slats and solid quadrant for holding small pieces of sponges, chamois, soap, etc. Extending upward from the base is a 3-foot riser. Attached to this and held at any height by a thumbscrew is a twin socket and 12-inch reflector. With the outfit is an 8-foot covered wire extension and socket wired for immediate use (Fig. 2).

Fig. 2—Can be carried around the garage

SPARK PLUG SWITCH

An accessory that will save the autoist much time and trouble is manufactured by the H. S. M. Auto Switch Company, of 1118 Betz Building, Philadelphia, Pa. It consists of a cut-out switch to be attached to the spark plugs. In the endeavor to locate which cylinder is missing fire under ordinary conditions one has to use some tool, as a screwdriver, which, to say the least, is primitive, and unless properly insulated will result in a shock. By attaching the H. S. M. auto switch to the plug at one end and the high-tension at the other it is possible to ascertain in a minute where the trouble lays, and if the handle is held in the position indicated in Fig. 3 in the majority of cases oil or carbon will be burnt away without taking the plug out, owing to the spark being intensified crossing the gap made by the switch. It also obviates dropping plug terminals in the pan as there is no necessity to undo the terminal completely to remove the switch. If the cause of the misfire is in the circuit and not the plug this can instantly be seen, as when the switch is raised no spark will jump to the plug.

THE KELLOGG FOUR-CYLINDER PUMP

The pump illustrated in Fig. 4 is manufactured by the Kellogg Manufacturing Company, of Rochester, N. Y., and can be used for pumping up the tires or used in connection with a distributor for cranking the motor. It consists of a four-cylinder motor built along the lines of a gas engine and the method of its attachment can be changed, when desired, to suit any particular car.

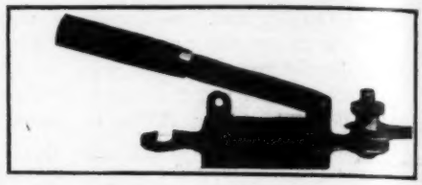

Fig. 3—Time-saving spark-plug switch

It is being fitted to all 1911 Peerless cars in the manner illustrated, driven direct from the secondary shaft of the gear box. This is operated by a lever at the side of the car. A hose which is connected to the pump is coiled under the front seat. To inflate a tire, merely couple this hose on to the tire, move the lever and start the engine. It can be fitted to any car and if room cannot be found to couple up to the gear box a belt transmission from the propeller shaft would answer equally well provided it was only required to pump the tires. The base is cast aluminum with a shaft running in bronze bearings. The lift is effected by a hardened-steel cam which runs to a bath of oil. The pump is 8 inches long, 7 inches high and 2 3-4 inches wide. Each cylinder pumps free air, and as one of the cylinders is always on the up stroke a steady flow of air is obtained at all times.

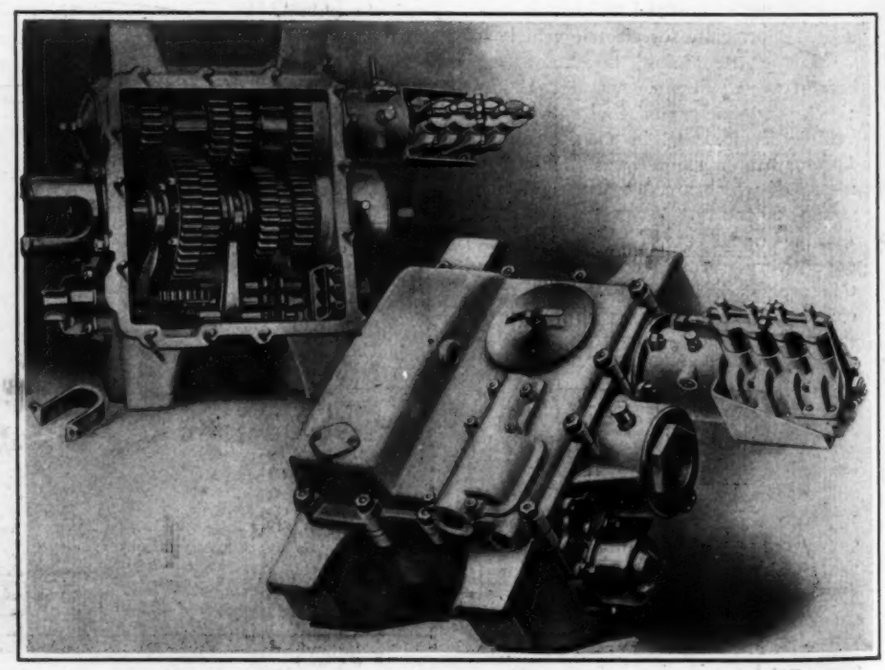

Fig. 4—A useful four-cylinder pump